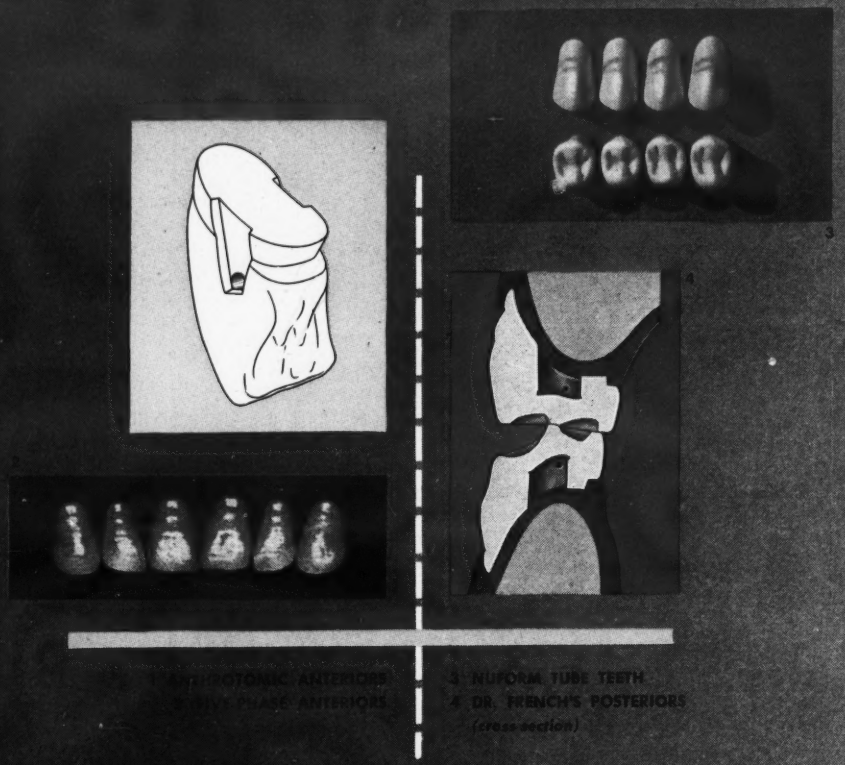
THE DENTAL Digest

NOVEMBER 1946



3 NUFORM TUBE TEETH
4 DR. FRENCH'S POSTERIORS
(cross-section)

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USE THE RED TO SEE THE YELLOW
USE THE LIGHT TO SEE THE DARK
USE THE DARK TO SEE THE LIGHT

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About Our CONTRIBUTORS

CHESTER J. HENSCHEL, D.D.S. (New York University College of Dentistry, 1929) will be remembered by readers of THE DIGEST during 1944 and 1945 as a contributor of a large number and wide variety of practical CLINICAL AND LABORATORY SUGGESTIONS. In articles in previous years he had presented the results of seven years of research on thermal control, a subject which he had also taught in postgraduate courses, lectured on, and presented before clinics. This month Doctor Henschel illustrates a combined hydrocolloid and compound technique for fabricating indirect inlays which are consistently excellent. This presentation is entitled A NEW APPROACH TO INLAY FABRICATION.

GEORGE A. MORGAN, D.D.S. (Royal College of Dental Surgeons, Toronto, 1930) departs this month from the subject of tumors, with which he dealt in a series of articles in 1944 and in A DERMOID CYST last month, to orient practitioners on the relationship of certain teeth to the maxillary sinus. THE MAXILLARY SINUS: SOME DENTAL DIAGNOSTIC AND SURGICAL PROBLEMS is presented by an exodontist.

EARL J. POE, D.D.S. (St. Louis University, School of Dentistry, 1918) gives details for preparing from a commercial denture tooth a lower anterior bridge pontic which he is finding in his general practice to be superior both as to strength and esthetics. His attention to this difficult problem of dental prosthesis has extended to the production of a 1500-foot Kodachrome motion picture entitled ANTERIOR RESTORATION.

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A New Approach to Precision Inlays

CHESTER J. HENSCHEL, D.D.S., New York City

This indirect technique for inlay fabrication embodies some radical, but practical, new concepts. Without special equipment, the most complex abutment casting may be fabricated as easily as a simple one; the impression takes from five to ten minutes. Castings thus produced are consistently equal to the best of those made by other methods. Much of the procedure may be left to a technician so that the operator is released for greater productivity.

HIGH LIGHTS of this technique are:

1. A resilient impression designed to negate contraction and to register accidental, planned, and natural undercuts.

2. An impression taken of a "dry" tooth.

3. Omission of oil as a lubricant on the die.

4. An investment phase planned to produce a casting which will fit the tooth with *predetermined frictional retention.* (The casting can seldom be returned to the die which, although in proportion to the tooth, is never identical with it.)

Advantages and Applicability

An attempt to develop an ideal inlay technique should have simplicity as well as technical and physiologic perfection as its goal. To succeed, it is not enough to assemble apparently suitable component phases into an entire fabrication process; the unreliability of attempts at precision casting is generally due to inadequate coordination of these fundamental steps and is further increased by some illogical concepts.

Fig. 1—Stone dies of some of the 2,000 cases completed with the combined hydrocolloid and compound impression technique.

Once the cavity preparation is completed, the first problem is to secure an impression of its complex surfaces, angles, and pits. The combined hydrocolloid and compound technique which I have developed serves successfully for almost any type of preparation, even that which lies considerably beneath the gingival margin and is subject to tissue and capillary seepage. With this technique (1) precision inlays may be fabricated more easily; (2) they require less chair time; (3) cause less strain, and (4) more nearly conform to an anatomic ideal yet achieve nontraumatic, functional occlusion. Such inlays have excellent marginal ridges and contact points; they exhibit *marginal area adaptation in depth* and are surely retentive but adequately insulated.

The "direct" method was used almost exclusively in my practice for a decade and is possibly the most expedient for simple inlays; but the proposed "indirect" system satisfies a different need. It is for those who wish (1) to do more casting, as in rehabilitation, or (2) to treat more patients and yet make no compromise in the aim for artistic, physical, or physiologic perfection. Over two thousand precision inlays have already been completed by this method (Fig. 1). It eliminates many of the disadvantages of current systems and combines their best features with some innovations. (While this impression technique may be used for cast crowns, the author obtains comparable results with the usual "straight" modeling compound method.)

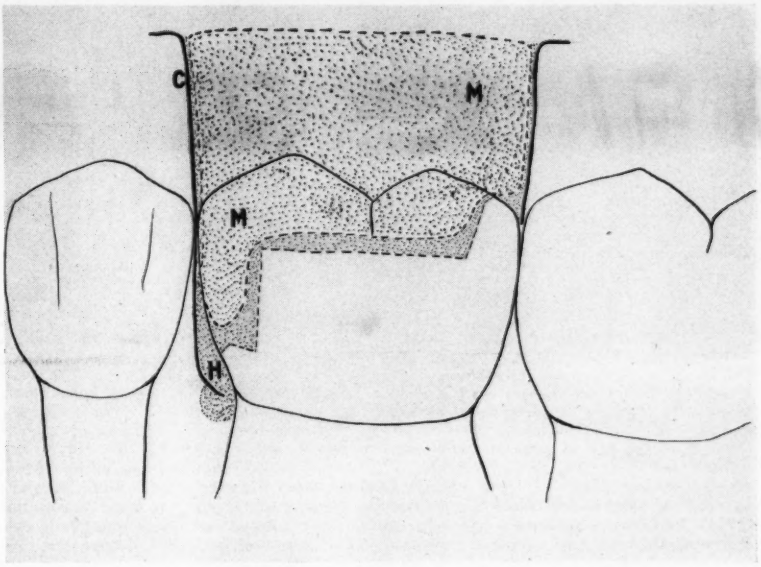


Fig. 2—Schematic cross section of an M.O. impression. C, copper tube; H, hydrocolloid; M, modeling compound. Copper tube is in position, festooned to clear distal contact point, and is expanded away from margins of preparation against distal of second bicuspid. Especially note cervical cupping of tube: This allows maximum bulk of hydrocolloid and retains impression material yet permits removal without distortion by gingival bulge of tooth. Modeling compound extends well into deeper recesses of preparation but has been trimmed so that rigid compound does not contact axial surfaces and guide impression from tooth.

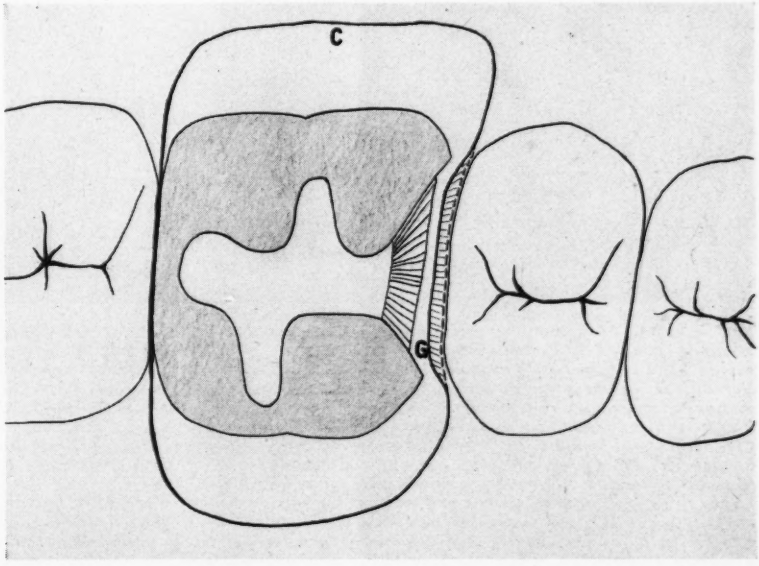


Fig. 3—Schematic occlusal view of M.O. impression. C, copper tube; G, gingival edge of tube. Note that copper tube is 3 to 5 sizes larger than ordinary impression and that there is: accurate fit on distal; free space on both buccal and lingual; close adaptation to adjacent contact point on mesial (dotted line), and cupping and contouring of gingival edge (solid line) to follow gingival bevel from buccal to lingual and as close and as far beneath as feasible.

The Technique

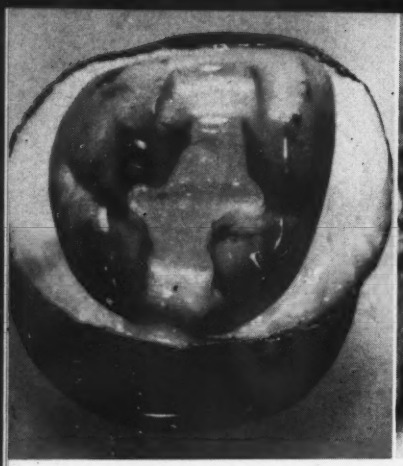
1. The impression is taken of a *dry* tooth (water is incompressible; an aqueous film has definite thickness) using dilute and regular hydrocolloid as a wash over a trimmed compound imprint in a specially shaped, annealed copper tube. The impression is adequately resilient to obviate distortion during removal.

2. Direct, chewed-in wax indexes are: a) seated on prepared, insulating stone dies; b) carved and readapted with an electric needle, and c) removed and treated as a direct pattern.

3. The investment and burn out technique for the smoothed and carefully adapted pattern is planned so that the casting need only be buffed, examined, and seated on the tooth without being returned to the die. (Note: Examination of castings with a 7-power loop under good light reveals surprising corrigible imperfections.)

This technique compensates for the coefficient of contraction of the inlay impression compound, hydrocolloid, or wax and possible volumetric

(*Text continued on page* 604)



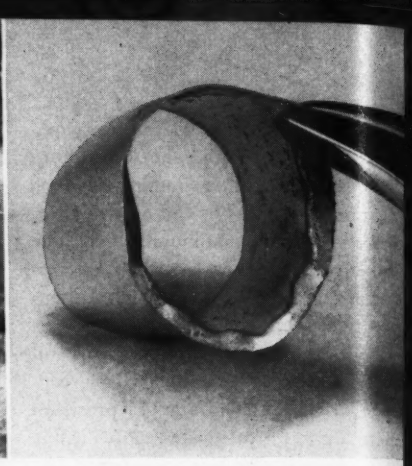


Fig. 4 (left)—M.O. molar impression. Copper tube is oversized; fits accurately at distal; has free space on buccal and lingual filled with thick layer of resilient hydrocolloid, and is cupped and fits closely along mesiogingival edge. Green stick compound shows through and is part of impression surface in many occlusal areas.

Fig. 5 (center)—M.O.B.L. preparation. Limited room between approximal axial and gingival line angles and the adjacent tooth surface makes case somewhat difficult. (A "straight" compound impression would require more time and experience and still be of doubtful accuracy. There is no question that if the operator is to perform entire process of fabrication, "direct" is a little faster; but completed casting is not as "finished" and much more chair time is needed for waxing and for adjustment, finishing, and cementation.)

Fig. 6 (right)—Flaring occlusal of copper tube. Copper tube is annealed and then flared with Peso pliers. Flared occlusal rim adds rigidity, offers a flat surface for finger pressure, and serves as a circumferential handle for lifting from tooth. Bending the flare creates irregularities inside copper for retention of modeling compound. All bands may be flared in advance, sized, and kept ready for use.

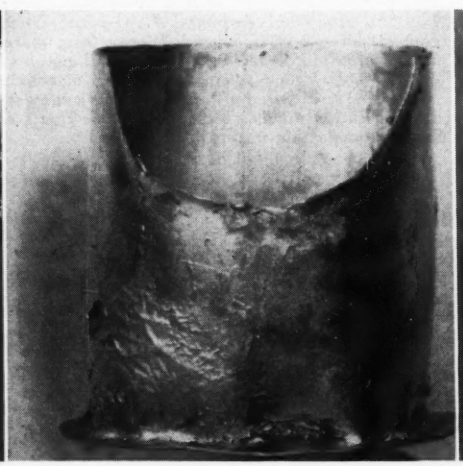


Fig. 7 (left)—Festooning is negligible when compared with accuracy required by compound techniques, but copper should extend 1 to 2 millimeters beyond cervical margin of preparation. For M.O.D. or three-quarter crown preparations coverage of mesiogingival margin should approximate coverage of distal.

Fig. 8 (center)—Flared, festooned, and annealed copper tube.

Fig. 9 (right)—Cupping. Bend or crimp cervical edge of tube inward with Peso pliers and alter buccolingual contour so that it parallels tooth contour in region of gingival margin. This serves to deflect gingival tissues and confine impression material; it also creates and maintains maximum space inside tube. Added space inside tube for hydrocolloid is provided when necessary by grinding. This thins outside copper adjacent to contact point and inside band near margins (Figs. 35 and 36).

Fig. 10 (left)—Fully prepared copper tube. Note how cervical cupping follows apparent gingival contours of preparation.

Fig. 11 (center)—Expanding copper (occlusal view). Maximum space for impression materials is obtained by passing hoe-type plastic burnisher inside tube while it is in place on tooth, the copper thus being expanded away from margins and bevels and toward adjacent tooth.

Fig. 12 (right)—Final annealing. Copper tube is flamed to a red heat and quenched in 70 per cent alcohol. At this stage, metal must be "dead soft." It may now be placed on tooth and jiggled up and down several times to eliminate binding and possible distortion during final lifting of completed impression. Kerr's green stick compound may be softened and pressed lightly onto seated band to secure vague imprint of preparation.

Fig. 13 (left)—Compound snap impression. Margins and accuracy are unnecessary. Impression may be jiggled free without chilling. Note cupping of copper at cervical with room for hydrocolloid. Insertion of compound in oversized copper band tends to withdraw interproximal walls inward. At this point, it may be wise to expand copper again from within with a plastic burnisher. When this is done, tube must be replaced on tooth and jiggled up and down again to prevent binding.

Fig. 14 (center)—Trimmed impression. Vertical surfaces are cut away with a lancet or spoon excavator so no axial contacts remain. No compound may guide impression from tooth. *Compound serves as occlusal stop to confine and retain hydrocolloid; and in extending into the recesses of the preparation, it relegates hydrocolloid to the function of a wash or rebase, minimizing contraction in final chilling.*

Fig. 15 (right)—Chloroform treatment. Compound and copper surfaces inside impression are swabbed with small chloroform-saturated cotton pledget. Rubbing should be continued until gumminess develops. Then motion may be changed to stippling which leaves chloro-compound smear over copper. For especially critical cases, roughen inside copper by grinding with small, coarse carborundum stone before *inserting compound.*

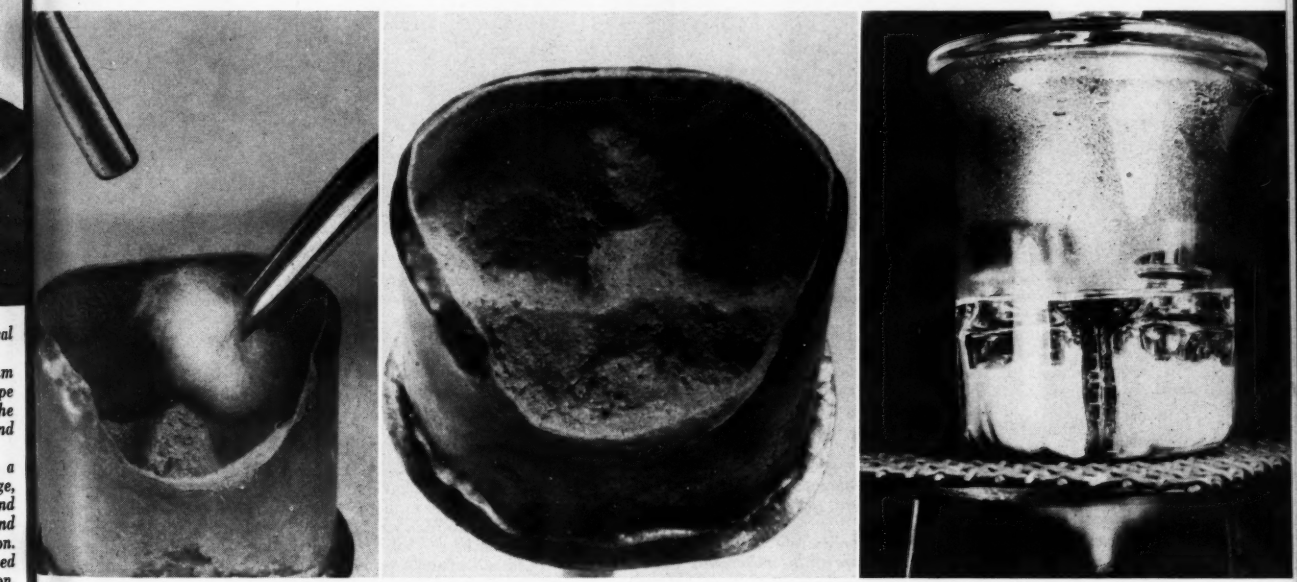


Fig. 16 (left)—Eliminating stickiness. Blow dry with blasts of cold air and absorb sticky surface on dry, tightly rolled cotton pledget. Do not purposely leave cotton fibers imbedded in compound, as they diminish retention of hydrocolloid. If only a few fibers are caught and remain, they are immaterial. Make sure compound is firmly adherent to copper tube; otherwise, seal together on flared end of tube with hot stick compound or hot instrument.

Fig. 17 (center)—Compound copper tray. Note stippled surface and ridges of compound comparable to recesses of preparation. Tray is now ready for hydrocolloid.

Fig. 18 (right)—Preparation of hydrocolloid. Two viscosities of boilable, reversible hydrocolloid are employed and prepared as follows: a) Dilute: Regular impression colloid diluted with 3 to 4 parts of water sufficiently thin, when boiled, to flow along line angles without spheroiding and trapping air; b) Regular: Usually used as it comes from manufacturer; should be thick but still stringy.

If either the thick or thin hydrocolloid is too heavy just prior to use, add a little hot water and stir vigorously. Each consistency is kept in an individual two-ounce, wide mouth glass bottle.

Both are boiled for from 10 *to* 15 *minutes and kept between* 150° *and* 212°*F., all day if desired, ready for use. These temperatures are not too high to be tolerable if hydrocolloid is not too quickly transferred to mouth, as the small amount of material used cools rapidly. Heating may be done in beaker, as illustrated, in sterilizer, or in* covered *compound heater.*

Recent supplies of hydrocolloid are white and offer no contrast with white die stone. Add a few drops of acriviolet or mercurochrome to hydrocolloid to color and to retard possible mold growth.

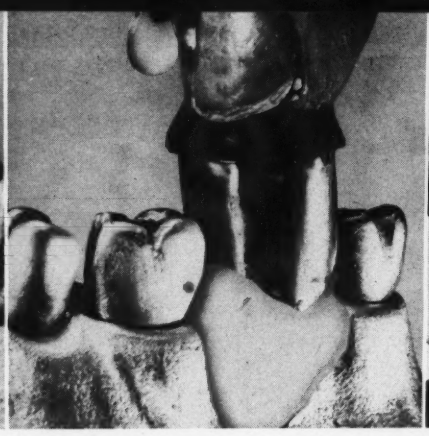
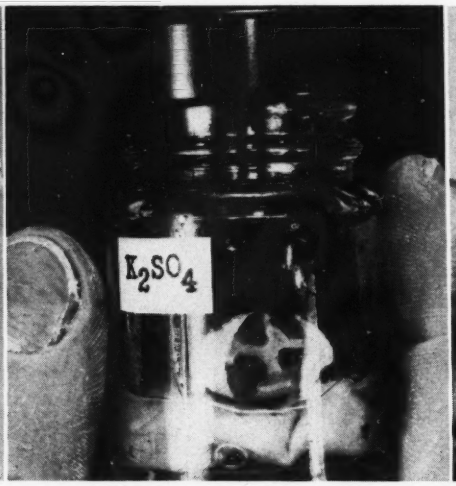


Fig. 19 (left)—Final imprinting. Stir regular and dilute hydrocolloid in respective bottles; isolate tooth with absorbent rolls; dry cavity, and flow dilute hydrocolloid along line angles and into recesses and pits of preparation with a sable (stiff) brush. Use small spatula and fill prepared tube with regular hydrocolloid; press to place on tooth.

Fig. 20 (center)—Chilling. Hold firmly with light pressure while chilling for about 30 seconds with cold tap water. The limited amount of hydrocolloid remaining in final impression makes rapid chilling practical.

Fig. 21 (right)—Removal. Trim excess extruded hydrocolloid. Lift off with universal scaler and one finger nail. Impression must not be directed; it must be allowed to slide off along path identical with median of all lines of least resistance.



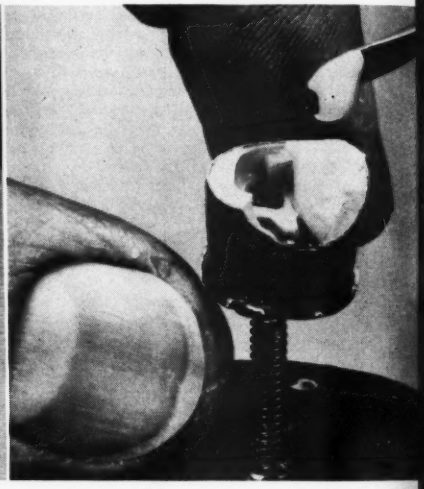
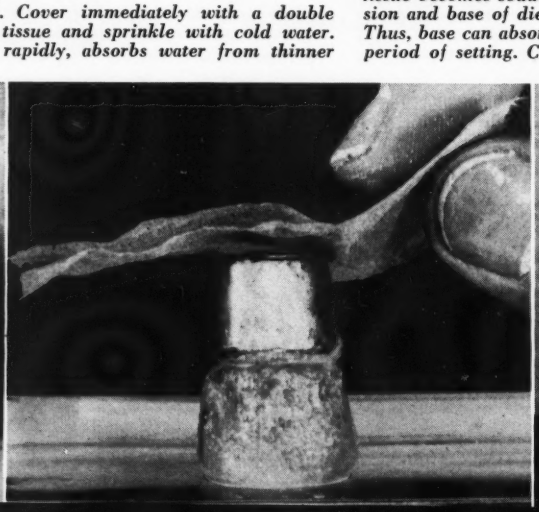


Fig. 22 (left)—Completed impression. After removal, trim away fragile excess hydrocolloid with sharp lancet. Note combination surface of both modeling compound and hydrocolloid, thick layer of hydrocolloid on buccal and lingual, and close adaptation of copper at mesial and distal edges. Carefully syringe impression with cold water to clear away debris and add several drops of potassium sulfate solution (colloid fixing solution: teaspoonful of powder to pint of water).

Fig. 23 (center)—Storage. Impression had best be filled with die stone immediately; but if not possible, it may be stored for several hours in a small, closed jar containing a soaking wet pad of cotton or cellulose. Accelerant potassium sulfate tends to neutralize colloid's retardation of setting stone.

Fig. 24 (right)—Filling impression. Shake out excess fluid and vibrate exceedingly small portion of creamy, mechanically spatulated die stone well into all recesses of impression to avoid trapping air nodules. Continue to add and vibrate small amounts of stone until full to overflowing. Sift die stone powder on surface of filled impression, vibrate, and repeat process until dry powder is absorbed only with difficulty.



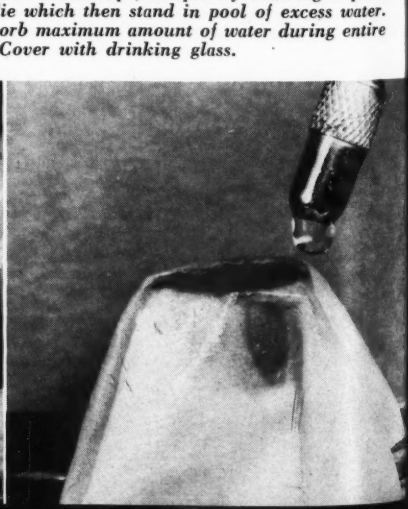


Fig. 25 (left)—Pedestal. Mix small amount of remaining stone to heavier putty-like consistency, mold into die base on glass slab, and invert filled tube impression, joining the two with gentle vibrating pressure.

Fig. 26 (center)—Water. Cover immediately with a double square of dry cleansing tissue and sprinkle with cold water. Thick mix of base sets rapidly, absorbs water from thinner stone still unset inside copper tube, and leaves too little water for complete crystallization.

Fig. 27 (right)—Crystallization. Continue to add water until tissue becomes sodden and droops, completely covering impression and base of die which then stand in pool of excess water. Thus, base can absorb maximum amount of water during entire period of setting. Cover with drinking glass.

Fig. 28 (left)—Separation. Allow stone to set at least 1½ hours, trim base, soften compound in warm water, and separate gently. Carefully lift away adherent hydrocolloid and dissolve residual compound with carbon tetrachloride.

Fig. 29 (center)—Die treatment. Dry die with gentle heat and place in mineral oil, preferably overnight, until oil penetrates appreciably. The intended lubricant between die and pattern is water soluble and would soak into dry stone die, not remaining on surface where needed. Oil-saturated stone core of die prevents this.

Fig. 30 (right)—Surface preparation. Remove die from oil, dry with tissue, and cleanse all oil from surface of die by swabbing with carbon tetrachloride. Blow dry. Wisps of remaining hydrocolloid may now be removed by wetting surface with 0.5 per cent Aerosol (a wetting agent and lubricant) and wiping with Aerosol-saturated cotton pledget.

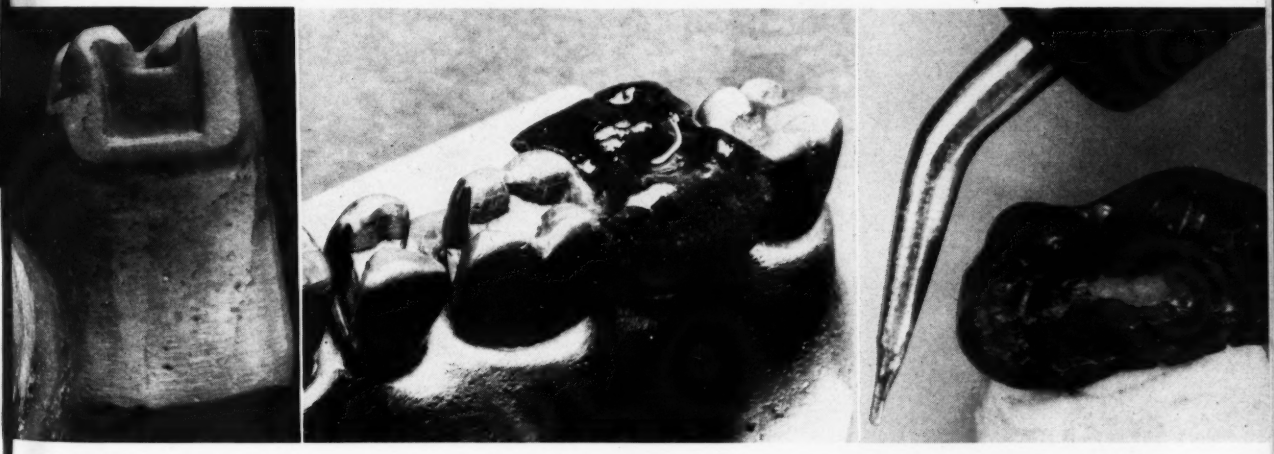


Fig. 31 (left)—Completed die. Subsurface saturated with oil; surface cleansed and lubricated with Aerosol. Margins may be marked with soft or indelible pencil. Wax can be melted and adapted against this relatively insulating surface with comparative ease (metal dies are excellent thermal conductors and cause wax to spheroid).

Fig. 32 (center)—Functional wax index. (To allow complete continuity of previous steps, this phase is presented now, when die is completed; in practice, it is best performed after chloroform treatment of compound snap impression and before taking final impression.)

Soften Kerr's regular inlay wax over flame as for a direct pattern; form into a cone and press into cavity, molding with fingers if necessary; allow patient to close and chew.

Scrape excess wax from adjacent teeth, carve roughly if desired, idealize level of marginal ridge, and remove.

Examine index by transmitted light to determine whether finished casting will be sufficiently thick (before taking final impression); then set aside until die is completed. Discrepancies in adaptation are easily corrected later with the electric waxing needle.

Fig. 33 (right)—Pattern adaptation. Hold wax index in closed hand to eliminate brittleness; then press index down firmly on oil-free, Aerosol-lubricated die.

With warmed blunt carver, trim excess wax and melt thin film of yellow crayon wax on area of contact point for caution.

Establish retention and fit by readapting desired line angles, retention areas, and pits with low voltage needle. The Ritter "bleaching" instrument—when ground, reshaped, and polished —serves admirably with proper adjustment on dental unit. The same instrument functions well in the laboratory when connected to a doorbell transformer.

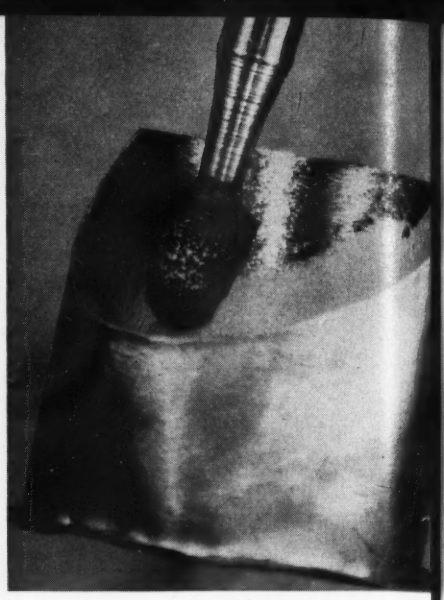


Fig. 34 (left)—Carving. Carve pattern and remove; cleanse die, apply Aerosol again, replace pattern and readapt. Carvings should harmonize with adjacent natural teeth but, in general, idealized anatomic carving with pointed cusps cut off or flattened serve quite well.

Fig. 35 (center)—Pattern treatment. Chill pattern, remove, and sprue. Cleanse wax with soap and hydrogen peroxide mixture; syringe with room temperature water; dry, paint with 0.5 per cent Aerosol (de-bubblizer), and blow dry again.

(Most inlay factors may be easily controlled but there are many possible individual aberrations in investment, burn out, and casting. If castings seem consistently loose fitting, do not omit asbestos from casting rings; choose a different investment —one with less expansion.)

Fig. 36 (right)—Roughening inside copper tube. Grinding inside copper with small, course stone to roughen metal for additional retention of hydrocolloid is not often necessary but is sometimes helpful. This step and that shown in Figure 37 also serve to thin copper to provide added room for hydrocolloid.

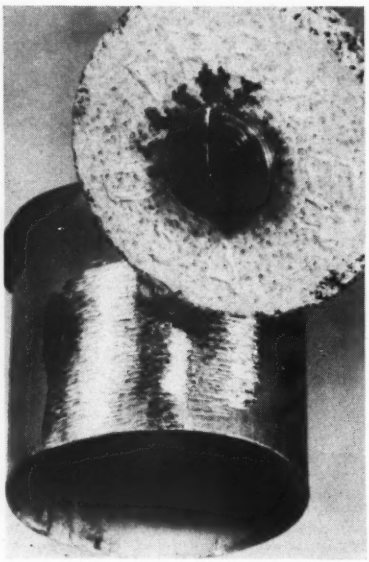


Fig. 37—Thinning copper. Where little space exists interproximally, especially in box type preparations, grind outside copper tube to the thickness of foil in region of adjacent contact area. This creates a surprising amount of added room inside tube.

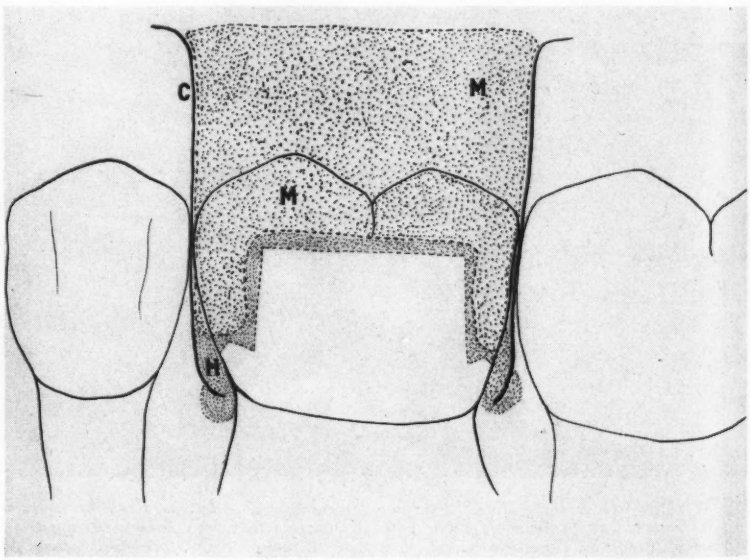


Fig. 38—Schematic cross section of M.O.D. impression. C, copper tube; H, hydrocolloid; M, modeling compound. Note similarity to simple M.O. type.

changes during the construction of the die. A complicated casting which is ideally retentive on the tooth is usually too tight on the die. To make the attempt for accuracy as complete as possible, oil should not be used as a lubricant on the surface of a die. *Imprinting a wet tooth and waxing on an oil-covered die accounts for much of the inaccuracy mistakenly believed to be inherent in any indirect technique.*

Materials

1. Hydrocolloid impression material (D.P. impression colloid).
2. Medium-fusing dental modeling compound (Kerr's green stick).
3. Copper tubes, 36-gauge, one-half inch long.
4. Die stone (Kerr's diolite).
5. Aerosol O.T. 0.5 per cent chloroform, mineral oil, carbon tetrachloride.

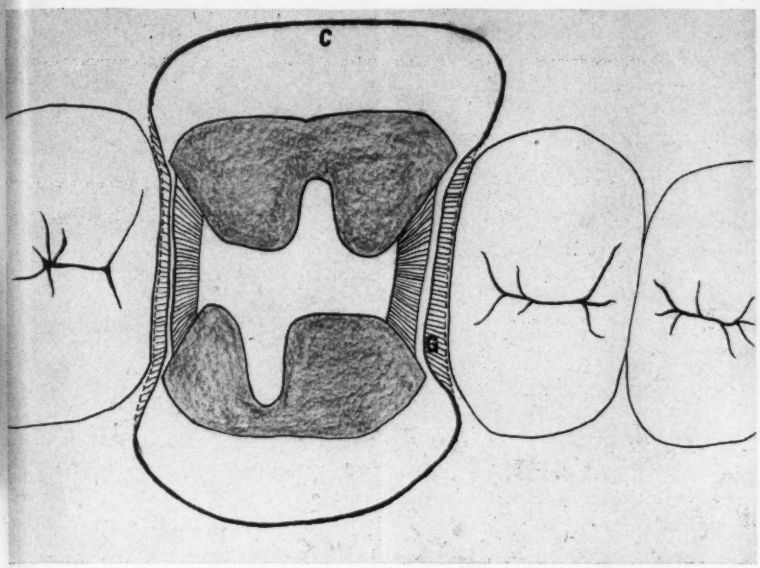


Fig. 39—Occlusal view of M.O.D. impression. C, copper tube; G, gingival edge of copper tube. Note how oversized copper tube is expanded to contact adjacent teeth at occlusal third (dotted line) and method of cupping and contouring gingival of copper tube to follow contour of cervical bevel (solid line). Also, note ample room for impression material on buccal and lingual.

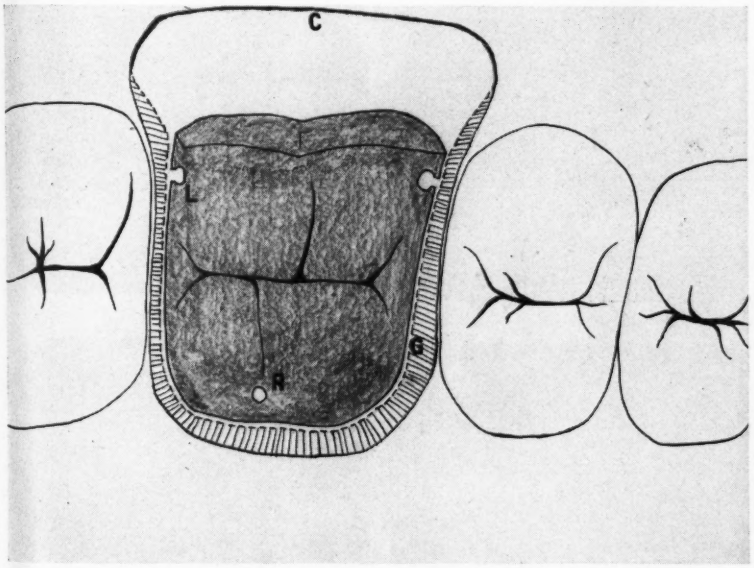


Fig. 41—Schematic occlusal view of molar three-quarter crown. C, copper tube; G, gingival edge of copper tube (dotted line); L, lock grooves; R, retention pit. Note close adaptation of soft copper edge (dotted line) to preparation. Elsewhere, copper is expanded and adapted to adjacent teeth, providing for thickness of hydrocolloid all around, especially on buccal where major undercuts may exist. The mesiodistal cross section is identical with M.O.D. illustration, Figure 38.

Dilute hydrocolloid is easily flowed into lock grooves with sable brush. While this may suffice for retention pits, a simpler and more conservative method is to insert a rod of polished, easily fitting, round, rustless wire into pit—one long enough to protrude 1½ millimeters. The protruding end should be pinched or flattened so that it will be grasped and held by modeling compound of impression which is softened when the tube is filled with hot hydrocolloid.

These pits may be drilled very narrow and with parallel walls, as distinguished from the wider, tapered variety usually required by other techniques.

Metal pins, imbedded in compound, are transferred into the stone die and twisted free when the stone is set, after which they may be used again. Pins should be polished to a slight taper, and a thin coating of wax or lacquer prevents their dropping out of the preparation. When use of pins is anticipated, use hydrocolloid hotter than usual to ensure softening compound.

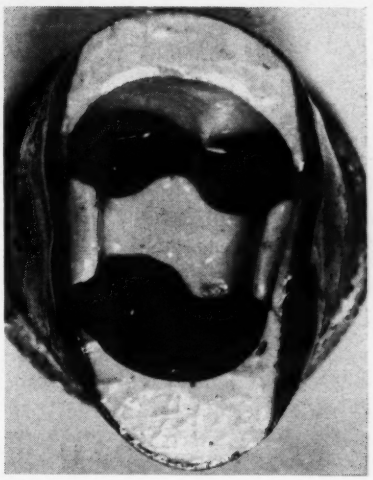


Fig. 40—M.O.D. molar impression. Note modeling compound composing much of occlusal surface; close adaptation; cupping and contour of cervical copper, and thick hydrocolloid on buccal and lingual.

Equipment

1. Sterilizer, compound heater (preferably covered), or any device capable of boiling water.
2. Two two-ounce, wide mouth bottles with bakelite caps.
3. Several assorted sable (stiff bristle) brushes, numbers 0 and 1.
4. Mechanical spatulator.
5. Electric model vibrator; low voltage, Ritter bleaching instrument.

Summary

1. The combined hydrocolloid and modeling compound technique *consistently* produces inlays equal to the *best* made by other methods.

2. The impression technique takes from five to ten minutes and may be

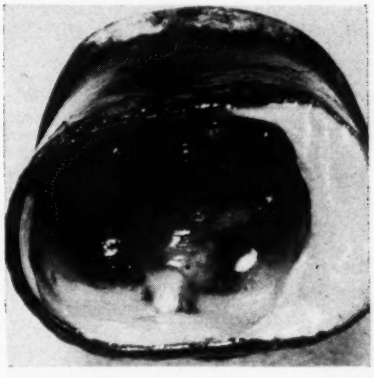
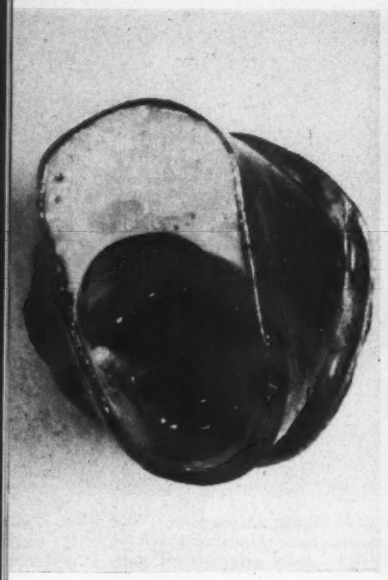


Fig. 42—Molar three-quarter crown impression.



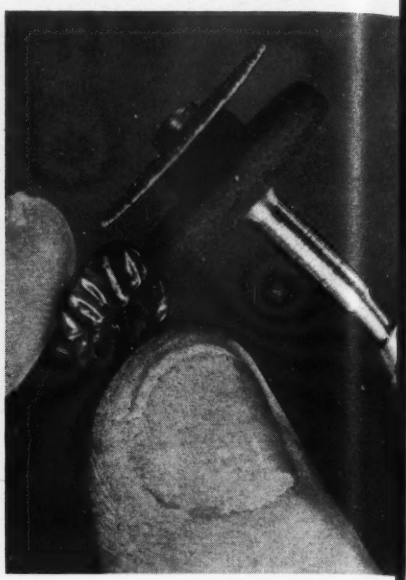


Fig. 43 (*left*)—*Bicuspid three-quarter crown impression with lingual retention pit.*
Fig. 44 (*center*)—*Grinding position of tandem mandrel. A time-saving method of adjusting contact points. A worn burlew disc is sandwiched between a Torit XX coarse porcelain finishing disc and a suitable rubber-polishing wheel in an ordinary mandrel—one having a conveniently long threaded head. The relative positions of the discs may be reversed.*
Fig. 45 (*right*)—*Satin-finishing position of tandem mandrel. This eliminates the necessity of changing mandrels, minimizes the tendency to remove too much gold at one time which creates shy contact point.*

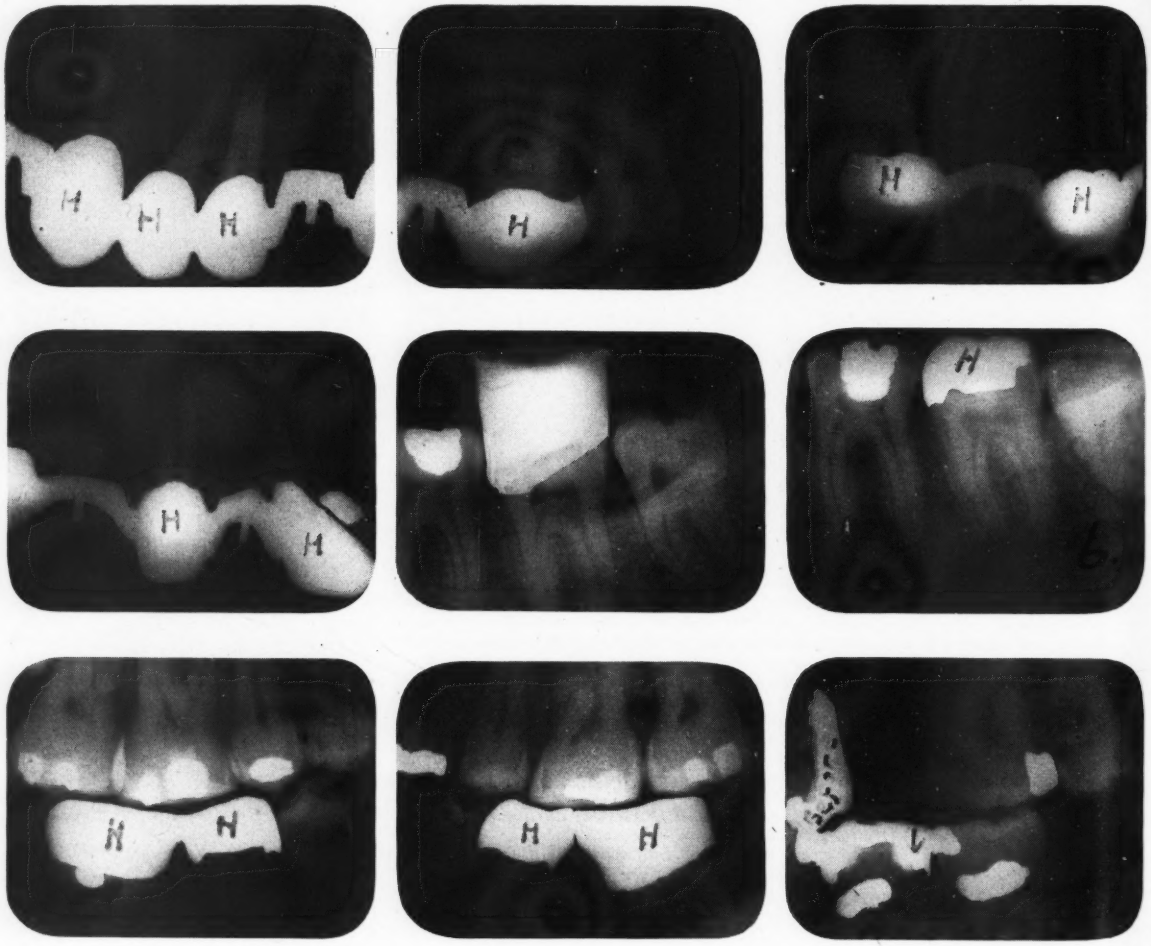


Fig. 46—Roentgenographs of completed cases: (1), (2), (3), and (4) Miscellaneous cuspid, bicuspid, and molar pit-lays and three-quarter crown abutments for prosthetic splint; (5) copper band in position prior to final impression; (6) completed cemented inlay, same case as (5); (7) and (8) right and left prosthetic splint from second bicuspid to second molar with marked drifting due to extraction of first molar; (9) and (10) remake of gold inlay, M.O.D. with distogingival margin well into cementum; (11) and (12) before and after surgical removal of second bicuspid, orthodontic correction of first bicuspid position, and prosthetic splint. Note how mesiogingival margin of molar three-quarter crown reconstructs area eroded by impaction; (13) pontilay to reconstruct second molar and contact mesial tooth for stability when treatment of bicuspid is contraindicated; (14) D.O. and two three-quarter crowns of a prosthetic splint; (15), (16), (17), (18), and (19) miscellaneous operative gold inlays; (20) four cast gold inlays including interlock in second molar from first molar to prevent elongation of second molar and to permit two upper molars to function against lower first molar.*

*The figure H inside roentgenograph of casting indicates it was fabricated by indirect hydrocolloid-compound technique.

included in the appointment for cavity preparation.

3. The method is applicable in 95 per cent of cases. With experience, a flawless impression usually results from the first attempt.

4. Since the method is completely indirect, it may be completed with the aid of a technician.

5. The use of a resilient impression material reproduces sharp gingival bevels, minimizes distortion during removal, and imprints preparations without cement bases, since slight undercuts are permissible.

6. The wax pattern, although indirect, is handled like a direct one, and the casting is rarely returned to the die.

7. Since a dry tooth is imprinted, no oil is used as a lubricant on the die, and volumetric changes are otherwise minimized; *predetermined frictional retention* is secured.

8. This retention is so positive and *marginal area adaptation* so accurate that pulpal surfaces of the casting may be relieved for insulation.

9. With functional occlusion, accurate anatomy, and finished margins thus obtained, there is little adjustment prior to cementation.

10. The completed cemented gold inlay possesses *marginal area adaptation in depth* and this apparently equals the otherwise incomparable virtue of the gold foil restoration.

1235 *Grand Concourse*

Nutritional Qualities of Breast Milk

REALIZATION of the importance of feeding the newborn properly has been increased in the past twenty years by the results of more exact methods for determining the comparative values of human milk and cow's milk. What the authorities of two decades ago inferred by clinical acumen, the modern nutritionist can prove in the laboratory.

Old Concepts

The older clinicians were practically united in their belief that breast milk was the ideal food for the newborn infant, provided that the milk came from a normal, well-nourished mother. Their investigations produced important data on the carbohydrate, fat, protein, and mineral content of breast milk—data which stood the practitioner in good stead when he had to devise substitutes for infants whose mothers were unable to provide natural food of sufficient quantity or quality. The borders of nutritional science have expanded, however, far beyond the narrow concepts of carbohydrate, fat, protein, and mineral constituents of food.

Recent Research on Breast Milk

To obtain a thorough review of the nutritional quality of mother's milk—a review which would take into account the extremely important substances which have revolutionized nutritional thought in the past decade: the vitamins—a large group of investigators was mobilized by the Nutrition Foundation, Inc., of New York. Working with the staff of the Research Laboratory of the Children's Fund of Michigan, and the Nutrition-

(*Continued on page* 634)

VITAMIN CONTENTS OF FRESH MATURE HUMAN AND BOVINE MILK

VITAMIN, CONCENTRATION PER 100 CC.	HUMAN MILK	COW'S MILK
Vitamin A, micrograms	65 (260 U.S.P. Units)	33 (132 U.S.P. Units)
Carotene, micrograms	25 (41 U.S.P. Units)	30 (50 U.S.P. Units)
Vitamin D, U.S.P. units	0.4 to 10	0.5 to 4.0
Ascorbic Acid, milligrams	5	2
Thiamine, micrograms	14	38
Riboflavin, micrograms	37	200
Nicotinic Acid, micrograms	183	85
Pantothenic Acid, micrograms	246	350
Pyridoxine, micrograms	4	67
Biotin, micrograms	0.8	3
Inositol, milligrams	33	18
Folic Acid, micrograms	45	5

*A Technique for Preparation of Palateless Full Upper Dentures**

LESLIE A. BOOTH, B.D.S., Flight Lieutenant, R.A.A.F.

A method is presented whereby full upper dentures having a minimum palatal surface may be prepared. The theory of how such dentures are retained in the mouth and the advantages of this type of denture are also outlined.

Anatomic Considerations

THE FOLLOWING structures must be considered in the construction of *all* full upper dentures:

Alveolar Ridge—The amount of stress this area is capable of bearing depends on the quantity and quality of connective tissue. Usually it is able to bear the greater part of the stress placed on a denture during mastication.

Maxillary Tuberosities — These areas are important in determining the degree of retention possible in a denture.

Relief Areas—In considering the future stability of any full upper denture, the hard area in the center of the palate, known as the relief area, is important. The degree of compression in this area is practically nil. To compensate for the greater compressibility at either side of the denture, this area must be relieved in the finished denture. If this is not done, a certain "seesaw" effect will usually result.

Degree of Compressibility of the Tissues—As there is no area of complete incompressibility of tissue on the palate, it is obvious that there must always be a certain amount of "give" when pressure is placed on the denture; a perfectly stable denture is impossible. However, by considering the various degrees of compressibility in different areas of the palate, it is possible to co-ordinate the areas so as to give the maximum stability.

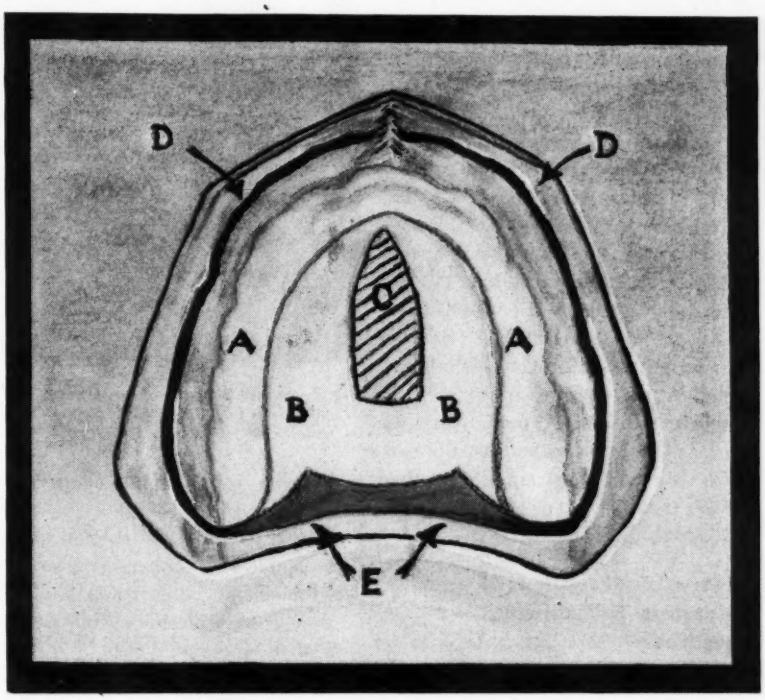


Fig. 1—The stress-bearing areas of the maxilla: (A) Primary stress-bearing area. (B) Secondary stress-bearing area. (C) Non-stress-bearing area. (D) Area of peripheral seal. (E) Postdam area.

Muscle Attachments—The various muscle attachments on the buccal and labial surfaces control the extent of the denture on these surfaces, since the muscle must be free to move as required without interference from the denture. Overextension of the denture causes interference with the numerous movements of the muscles attached around the periphery of the denture and this interference in turn results in dislodgement of the denture.

Stress-bearing and Non-stress-bearing Areas

The denture-bearing surface, which is determined by the muscle attachments, can be divided into the following areas (Fig. 1):

A. Primary Stress-bearing Area —This area is principally the alveolar ridge. The covering of the bone is moderately compressible. It provides a firm surface capable of withstanding considerable force and at the same time of distributing occlusal shock. The boundaries of this area can be determined by palpation.

B. Secondary Stress-bearing Area—This is the area covered by firm but compressible tissues which are capable of bearing only a limited portion of the occlusal stress. These tissues are more compressible than those of the primary stress-bearing area.

C. Non-stress-bearing or Relief

*Adapted from *The Dental Journal of Australia* 18:115-121 (March) 1946.

Area—This area is located around the intermaxillary suture and can also be determined by palpation. It should extend to the small incisive papilla behind the central incisors. In extreme cases, this area presents a hard, elevated surface as in the case of torus palatinus.

D. Area of Peripheral Valve Seal—This is the area along the border of the labial and buccal surfaces of the alveolar ridge which will permit a slight degree of compression, thereby giving a seal along the peripheral border of the denture.

E. Postdam Area—This area is most important in creating a seal along the posterior border of the normal denture. Its posterior borders extend from the pterygomaxillary notch immediately posterior to the tuberosity, to the posterior nasal spine and to the notch on the other side of the palate. Its anterior border is governed by the compressibility of the tissues covering the junction of the hard and soft palates and usually extends to a point just anterior to the greater palatine foramen and just anterior to the posterior nasal spine.

Theory of Retention of Palateless Full Upper Dentures

As with all dentures, a close adaptation of the base of the denture to the tissue-bearing surface and an effective seal around the periphery are necessary for the success of a palateless denture. In the normal denture, this seal is obtained around the peripheral valve seal area by producing a slight compression of the tissues in the area. The seal on the posterior border is produced by extending the denture to the posterior border of the postdam area and thus gaining slight compression over the whole postdam area.

In the construction of the palateless full upper denture, the peripheral seal is obtained in the same way; but the seal on the posterior border is obtained by compressing the tissues of the secondary stress-bearing area in the following manner:

1. In the postdam area, a reasonable degree of compression is possible, so the seal line should be as broad and as deep as the degree of compressibility in individual cases permits.

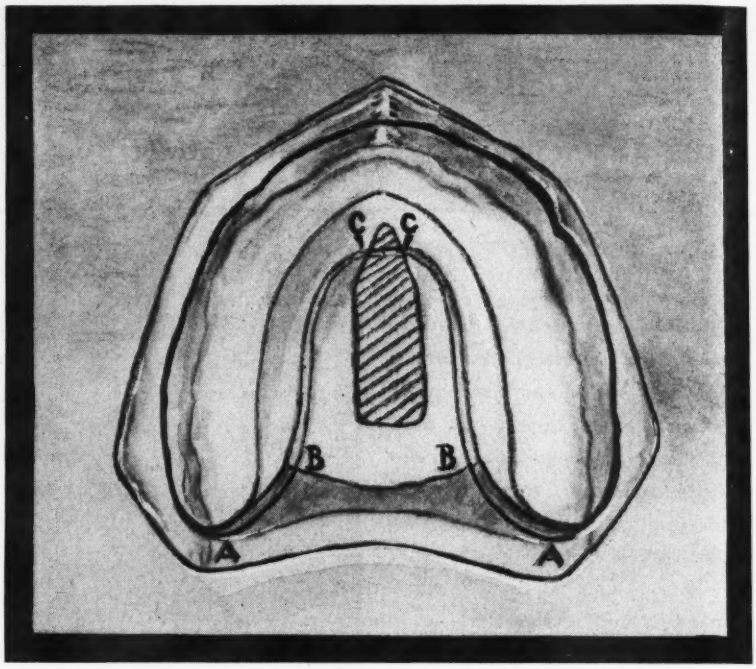


Fig. 2—Shows preparation of the cast for a palateless denture. (AC) Posterior border of palateless full upper denture extending from pterygomaxillary notch (A) to edge of relief area (C).

2. The secondary stress-bearing area is not so compressible; so the seal line should be narrower and not so deep—again depending on the tissues of the individual case.

3. Over the relief area the tissues are not readily compressible, so the seal line should be narrow and deep (Fig. 2).

Establishing Peripheral Seal on Posterior Edge

1. A model is prepared and bite-blocks are made by one of the approved impression techniques.

2. After recording the bite, the palate is palpated and the areas previously discussed are marked on the model; that is, primary and secondary stress-bearing areas, relief and postdam areas, and the extent of the buccal and labial flanges.

3. The peripheral seal is prepared by lightly scraping a broad shallow band around the marked peripheral border on the model.

4. The posterior border (line AC in Fig. 2) is marked by a line extending from the pterygomaxillary notch, along the anterior border of the postdam area, and across the secondary stress-bearing area to a convenient point C on the edge of the relief area. This point C should be selected with a view to the ultimate strength of the finished denture so that the line CC is as short as possible yet is in a reasonably compressible part of the relief area.

5. The line AB is now scraped out on the model with a wide deep groove. The anterior edge of this groove should follow the anterior edge of the postdam area.

6. The line BC is then scraped out but neither as deeply nor as broadly as AB.

7. A deep hair line is then cut with the edge of a wax knife along the line CC.

8. The denture is next set up, freedom of lateral movement in the articulation being allowed, and completed in the usual manner.

9. On insertion, the retention may not be sufficient at first; but after the denture has been in place for a day or two, the patient should be recalled and spot grinding for lateral movements carried out. It will usually be found that this procedure increases the retention satisfactorily.

Advantages

Comfort and Freedom of Lingual Movement—Elimination of the bulk of the palatal surface of the denture enables the tongue to move more freely and does away with the sensation of "a mouthful of teeth." The patient can thus become accustomed to the denture more readily.

Decreased Area of Inflammation—The mucous membrane of the palate is less inflamed because the denture covers less area, and therefore the health of the tissues is preserved.

Weight—The denture, being less bulky, is not as weighty as a full palate case, and therefore requires less retentive force to hold it in place. The difference in weight is more marked with vulcanite than with acrylic.

Stability—In a case where a torus palatinus is present, the posterior border extends around this hard area and so eliminates the difficulties which arise when the denture base covers this area.

Sensitivity—Cases frequently arise where, owing to undue sensitivity of the posterior portion of the palate, the patient experiences great difficulty in tolerating a normal denture. The palateless denture eliminates gagging when the denture is in place.

Indications for Use

The palateless full upper denture is indicated in cases in which the folfollowing conditions are present:

1. A torus palatinus.
2. Abnormal sensitivity of the posterior portion of the palatal mucosa.
3. A large, freely mobile, and sensitive tongue.
4. A dislike on the part of the patient of a large area of denture base over the palate which leads to discomfort.

Contraindications for Use

The palateless full upper denture is not indicated in cases in which the following conditions are present:

1. Badly developed ridges or tuberosities which interfere with retention.
2. Only slight compressibility of the tissues of the secondary stress-bearing area.
3. Wide relief areas which will make it difficult to gain an effective seal line.

Conclusions

The use of a palateless denture is beneficial in many cases. The retention and stability is usually as good as in the case of a full palate denture, provided lateral grinding is carried out. This technique, although limited in its application, is helpful in overcoming some of the difficulties encountered in full denture construction.

Intravenous Procaine Analgesia

FREDERICK M. ALLEN, M.D., LYMAN WEEKS CROSSMAN, M.D., and L. VOSBURGH LYONS, M.D., New York

THE ABNORMALLY increased capillary permeability in injured regions has long been known, especially in studies of shock. In experiments, published between 1939 and 1943, large intravenous injections of either plasma or salt solution resulted in huge fluid accumulations in the injured parts of animals with traumatic shock, but not elsewhere; and no comparable exudation was caused by such injections in animals with hemorrhagic shock.

Observations on Tissue Permeability

Permeability is evidently a dominant factor in the distribution of any substances in the body. The increased permeability of injured or inflamed tissues presumably accounts for the especially high concentration of drugs, such as salicylates, in these tissues as observed by pharmacologists.

1. Lundy relieved pruritus in several jaundiced patients by intravenous injection of 20 cubic centimeters of 0.1 per cent procaine solution or by adding 1 gram of procaine to 1 liter of physiologic saline and infusing the solution slowly into a vein. The relief continued for about four hours after the injection. This result seems to conform to the theory of increased capillary permeability of injured or inflamed tissues: The skin irritation, intensified perhaps by scratching, was accompanied by increased permeability of capillaries which allowed the circulating procaine to diffuse out particularly in these areas and anesthetize the nerve endings in the tissues.

2. Gordon administered procaine intravenously to ten burned patients, obtaining analgesia of the burned area but not of other parts, unless the other parts became edematous. The maximum duration of analgesic effect was six hours and the degree of analgesia was sufficient to permit changing dressings comfortably.

3. Bigelow and Harrison injected 5 to 40 cubic centimeters of 2 per cent procaine solution subcutaneously in the arms of normal individuals and found only a slight elevation of the pain threshold, lasting no more than 70 to 80 minutes.

4. In ten surgical cases, McLachlin found intravenous procaine infusions superior to morphine for control of postoperative pain. He admitted an antagonism between procaine and sulfathiazole.

All these reports conformed precisely to the theoretical expectation; namely, relief of pain by transudation of procaine in areas where capillary permeability is increased in connection with injury, inflammation or edema, especially when the procaine is administered intravenously with considerable fluid.

Method of Administration

Original—1. Lundy's procedure, adopted as a standard by Gordon and McLachlin, consists in dissolving 1 gram of procaine in 500 or 1000 cubic centimeters of saline solution and administering it by intravenous drip in one to one and one-half hours.

(*Continued on page* 635)

The Maxillary Sinus: Some Dental Diagnostic and Surgical Problems

GEORGE A. MORGAN, D.D.S., Toronto

The proximity of certain teeth to the maxillary sinus, chiefly maxillary molars and bicuspids, creates extraction problems. Their handling requires a specific knowledge of the normal and abnormal anatomy of the sinus and the bony structures adjoining it. The application of this knowledge to the taking and study of roentgenograms of the maxillary region makes possible a satisfactory diagnosis of the surgical problem to be dealt with.

DESPITE recent rhinologic-dental cooperation, there still remain many diagnostic problems involving the relationship of the teeth to the maxillary sinus. These problems demand, on behalf of both the rhinologist and the dentist, additional study and cooperation.

Anatomic Relationships

The maxillary sinus (Antrum of Highmore) is a cavity in the body of the maxilla, which communicates with the middle meatus of the nose. Its form is roughly pyramidal, the apex lying upward and distally toward the malar bone, the lateral walls being formed by the inner aspect of the lateral wall of the nose and the inner aspect of the uppermost portion of the alveolar buccal bone. The floor may be said to be the lowermost portion of the maxillary sinus and may extend as far forward as the lateral tooth and as far distally as the heel of the maxilla.

1. The hiatus semilunaris, the opening which connects the sinus with the nasal cavity, lies high up on the nasal wall of the sinus and opens below the middle turbinate bone in the nose.

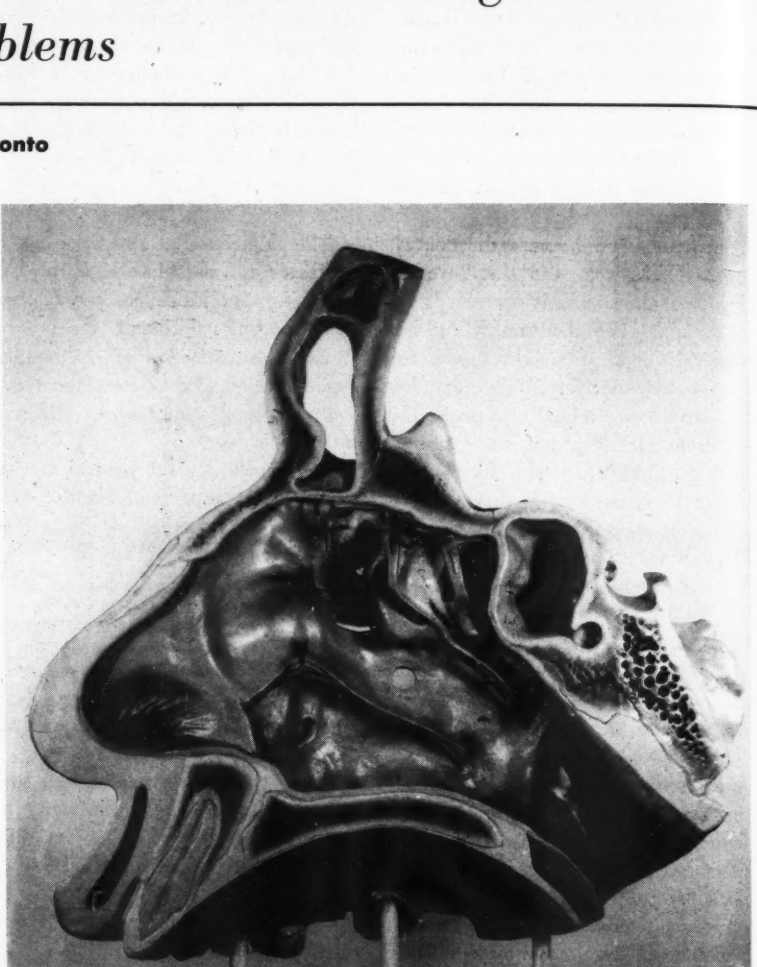


Fig. 1—Represents sagittally the approximate anatomic nasal relationship and shows physiologic nasal sinus opening.

2. The sinus is sometimes divided into two or more parts by incomplete bony septa or by long septa into chambers. It is lined throughout with mucoperiosteum equipped with cilia which wave secretions toward the hiatus semilunaris and out into the nose.

3. The floor of the sinus is usually very uneven due to the prominences corresponding to the roots of the molar teeth. In most cases, the bone separating the teeth from the sinus is thin and occasionally the roots project into it. The teeth which come into closest relationship with the sinus are the first and second molars, but the alveoli of any of the teeth lodged in the maxilla may, under diseased conditions, communicate with the sinus.

4. In the majority of cases, the sinus floor begins between the cuspid

and second bicuspid, in 25 per cent of cases at points from the second bicuspid to the first molar, and in approximately 3 per cent of cases it extends as far forward as the cuspid. The second molar roots occupy positions in the walls of the sinus more frequently than the roots of any other teeth. In a great percentage of cases, some obstruction, generally in the form of a septum, is to be found on the floor of the sinus. These septa are invariably found over the teeth, running normally in a mediolateral direction.

Roentgenographic Examination

The most important requisite for detecting individual anatomic variations is the roentgen ray; and because a clear picture of the apexes of the maxillary molars is essential, it is necessary to employ the correct technique.

1. The patient should sit erect in the chair with the sagittal plane of the head perpendicular and the occlusal plane of the maxillary teeth parallel to the floor.

2. The film is placed with the long axis in a horizontal position, so that the anterior margin will come between the second bicuspid and first molar.

3. The lower edge of the film should extend approximately one-eighth of an inch below the occlusal surface of the teeth, the teeth being parallel and vertical with the film.

4. With the film in this position, the operator places the patient's index finger on the median line of the vault, thereby holding the film in place by slight pressure along the upper edge. Pressure by the finger should *not* be exerted toward the teeth. The film should *not* be bent before insertion.

5. The rays are directed at right angles to the line of bisection between the film and the teeth, with the central portion of the rays directed underneath the malar process and centered at the second molar. In the majority of cases the angulation will be approxixmately 25 to 30 degrees.

Diagnosis

In order to interpret roentgeno-

Fig. 2—Represents the approximate anatomic relationship of a normal-sized maxillary sinus to the molar and bicuspid teeth.

Fig. 3—Represents the approximate anatomic relationship of a normal-sized maxillary sinus to the molar teeth and shows sinus septum.

grams of the maxillary sinus region intelligently, one must have a clear-cut picture of the possible anatomic normal and abnormal variations, coupled with a knowledge of the normal dental anatomy and the individual bone characteristics surrounding this area. Variations in the size and shape of the maxillary sinus; of the zygomatic process; height and width of the vault of the mouth; the size and shape, if present, of torus palatinus or tori maxillaris buccalis; and the comparative inaccessibility of the region, are a few of the difficulties which should be considered in a dental diagnosis. One should keep in mind that in approximately 1 per cent of cases the maxillary sinus extends as far forward as the lateral incisor.

Surgical Problems

1. The relationship of the maxillary molars and bicuspid teeth to the maxillary sinus is of paramount importance where the removal of such teeth is indicated. In many instances, the apical ends of these teeth lie in close proximity to the floor of the sinus; so long as this is the case, accidental or pathologic perforations will be frequent. When such a perforation does occur, it is best to allow the alveolus to fill with a normal clot and, if complications develop, to refer the patient to an otolaryngologist to see that the physiologic opening into the nose is sufficient to take care of the drainage.

2. It is generally conceded that most perforations of the sinus floor are the result of an attempt to remove fractured apical ends of the lingual root of the maxillary first molar. The fracture is usually due to a buccal luxating movement. Maxillary molars and bicuspids which lie in close proximity to the sinus and which have anatomic variations such as hypercementosis or malformed root structures should be surgically removed. It is also suggested that this technique be employed where heavy buccal bone structure precludes the possibility of a straight extraction.

3. In the case of root tips which have been accidentally pushed into the sinus it is suggested that a roentgenogram of the area be taken before any attempt at removal is made. If the lost root tip lies directly above the sinus puncture, an enlargement of the opening together with air pressure from within will frequently remove the broken fragment. Air pressure from within is secured by holding the nose and asking the patient to blow out through the nasal passage. This procedure forces air into the sinuses and has a tendency to dislodge the root.

4. If the root has moved from a position directly above its entrance opening, it is suggested that the alveolus be cleaned of any debris and a sinus window made overlying the apparent position of the root and the root lifted out by means of a platinum loop needle.

5. Because of the close proximity of the root apexes to the floor of the sinus, there is a great possibility of radicular cysts pushing their way into it. In some cases in which this occurs, the diagnosis is obscure, if the cyst cannot be traced directly to the root of the tooth, because of the possibility that septa are present in the sinus. Some method must be used that clearly differentiates a cyst from a sinus divided by a septum and demonstrates the thickened antral membrane found in chronic sinus infection. By use of radiopaque solutions injected into the sinus, the antral cyst, the thickened membrane, the area of polypoid degeneration of chronic infection, and sinuses divided by septa may be plainly and positively demonstrated.

Conclusions

1. Restorations for and the treatment of disease conditions of teeth such as the maxillary molars and bicuspids, which occupy positions in intimate relation to the floor of the sinus, require special study.

2. The roentgenogram provides more information concerning the structures adjacent to the maxillary sinus than perhaps any other clinical means of study.

3. The dentist cannot interpret what is recorded on a film unless he knows the normal and abnormal anatomy of the structure being studied, its variations, and how the normal structure changes under the influence of disease.

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We hope that you will accept this invitation!

The Editor's Page

ALTHOUGH it has been demonstrated[1] that the activity of dental caries may be reduced by the local application of an aqueous solution of sodium fluoride, this procedure has not become a widely used clinical treatment. In a recent publication, Bibby[2] and his coworkers have demonstrated that the inclusion of sodium fluoride in a prophylaxis paste of pumice and hydrogen peroxide reduces the caries rate among children by 25 per cent if two fluoride prophylaxes are given each year, and by 43 per cent if three prophylaxes are given. The mixture used is prepared by adding one-third volume of a 4 per cent solution of sodium fluoride to commercial hydrogen peroxide 3 per cent. This 1 per cent solution of sodium fluoride and peroxide is incorporated with pumice in an amount sufficient to make a fluid paste. The paste is used in rubber cups or engine brushes to polish the exposed tooth surfaces.

In the same publication, Bibby reports the experiment conducted among dental students who used a 1:1000 solution of sodium fluoride three times weekly over a period of one year. Among this group there was no significant reduction in the incidence of caries.

These studies reported are somewhat paradoxical. It is hard to reconcile the conflicting results wherein one group receiving fluoride in paste form in a 1 per cent concentration *two or three times a year* had a notable reduction in the caries rate while in another group who received the fluoride as a mouthwash in a 0.1 per cent solution *three times a week* had no reduction in the caries rate. Bibby, in commenting on these results, says: "This result is, at first thought, a little surprising since it is obvious that the teeth in the mouthwash study must have had a considerably greater exposure to the fluoride than did those in either of the prophylaxes experiments. . . . There are, however, several reasons why these results should not be interpreted as proving that the activity of dental caries cannot be reduced by the use of fluoride-containing mouthwashes. One of these reasons may be that a clean tooth surface or even functional contact may be needed to bring about the reaction between the fluorides and the tooth. A second, and probably more important reason, is that there is accumulating evidence to suggest that fluorides are effective in reducing dental decay only when they are brought in contact with teeth which have fairly recently erupted into the mouth."

The evidence seems to suggest that the local application of sodium fluoride to reduce caries is most effective among children and upon recently erupted teeth. Inasmuch as all the permanent teeth except the third molars erupt during the years when the child is in primary school, it should be a simple procedure for every school child to receive two or three prophylaxes each year during the eight primary school years. Such a program could be undertaken by any school board. The services of dental hygienists would be required. The equipment requirements would be inconsequential. Few instruments and little outlay for supplies are needed in such a preventive program. One hygienist could give 4,000 treatments a year at a cost of no more than $1.00 per treatment. Three dollars per year for fluoride treatments for the 17,640,000 children[3] in the primary schools of the United States would cost approximately $53,000,000.

This is a small amount indeed if the caries rate could be reduced even 25 per cent. The savings in facial disfigurement, pain, and in the baneful sequelae from dental disease would be beyond any dollar mark. Those of us who believe in community responsibility and in individual enterprise would prefer to see such a program of disease control financed from local school funds or by voluntary health agencies. If that is not feasible, this is one form of federalized health service that is not objectionable.

---

[1]Bibby, B. G.: The Use of Fluorine in the Prevention of Dental Caries, J.A.D.A. 31:317-321 (March) 1944.

[2]Bibby, B. G.: Dental Caries: Fluoride Prophylactic Mixture, J.A.D.A. 25:207-211 (August) 1946.

[3]Chicago Daily News National Almanac for 1946, The Chicago Daily News, Inc., p. 534.

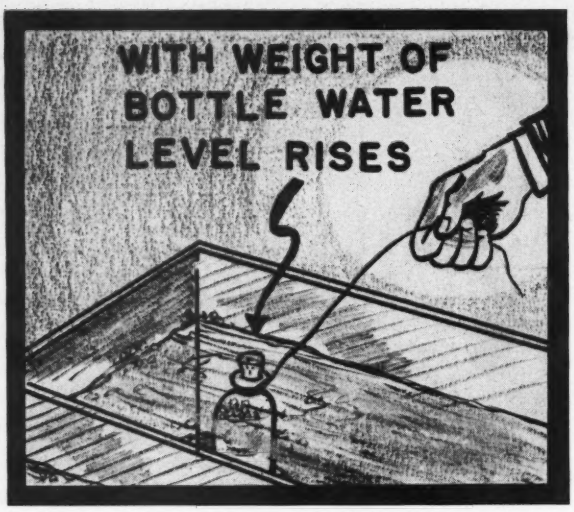


Fig. 1

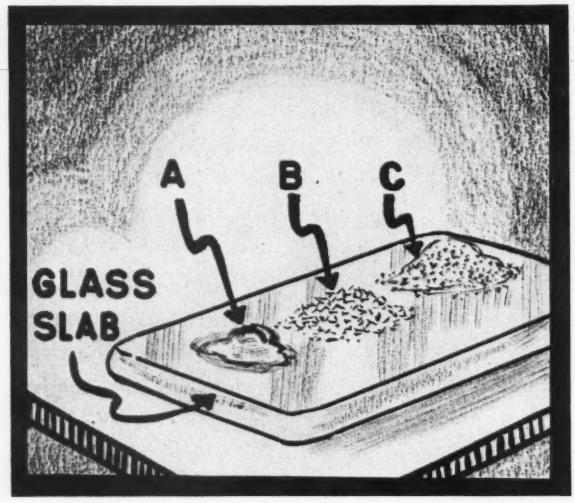


Fig. 2

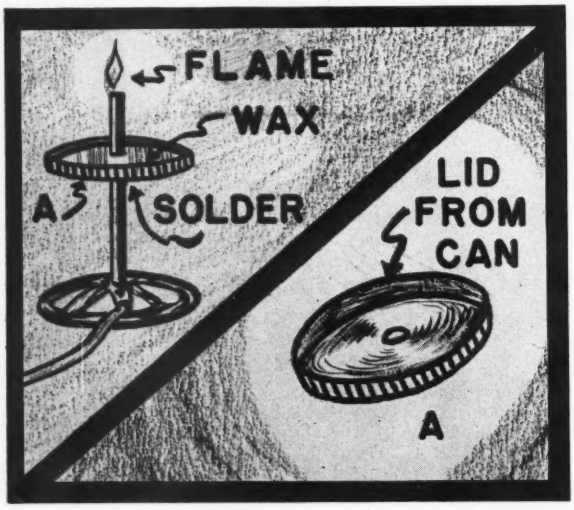


Fig. 3

Clinical and Laborato

Raising the Level of the Developing Solution

J. J. Moran, D.D.S., Chicago

Fig. 1—When the level of the developing solution is too low, films on the upper clips fail to touch the solution. To raise the level, it is usually necessary to add more solution or to change the solution. Another method of raising the liquid level is to float a clean empty bottle in the solution.

Combination Tooth Restoration Material

Harry Snitow, D.D.S., New York

Fig. 2—On a glass slab, place several drops of cement liquid (A), some silver filings (B), and cement powder (C) in an amount twice that of the metal filings. Mix the powder and the metal particles with the spatula, draw this mixture into the cement liquid, and spatulate the same as for any cement. This strong plastic restorative material is suitable for deciduous and permanent teeth.

A Wax Heater

Captain C. W. Popivchak (DC), Fort Jackson, South Carolina

Fig. 3—Use a lid from a can of suitable size. Cut a hole in the center of the can the same size as the pipe on the Bunsen burner. This circular metal container is soldered to place about two inches from the top of the burner. Wax placed in the container will be kept warm and ready for instant use.

Readers are Urged to Collect $10.00

For every practical clinical or laboratory suggestion that is usable, THE DENTAL DIGEST will pay $10.00 on publication.

You do not have to write an article. Furnish us with rough drawings or sketches, from which we will make suitable illustrations; write a brief description of the

Protecting the Soft Tissues From Injury by the X-ray Film

E. G. Ostos, D.D.S., Torreon, Coah, Mexico

Fig. 4—Certain areas of the mouth are subject to injuries from cutting by the x-ray film. A protective shield may be made by covering the film border with cotton or by slitting a cotton roll and imbedding the film in the cotton.

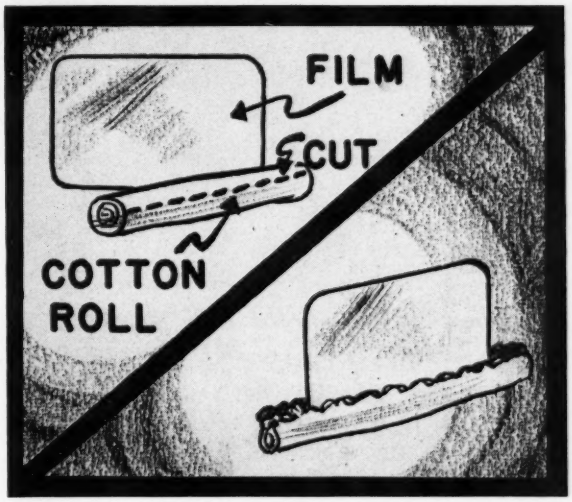


Fig. 4

Registration of Centric Occlusion

Maxwell E. Stone, D.D.S., Bloomfield, New Jersey

Fig. 5—On the occlusal wax rim, insert a small orangewood stick across the palatal portion in the second bicuspid area. When registering centric by closing the jaws, have the patient keep the tongue back of the stick. This method in most cases prevents the patient from giving a protrusive bite.

Fig. 5

Building Contact Points on Wax Patterns

Chester J. Henschel, D.D.S., New York

Fig. 6—For direct patterns or direct functional wax indexes for the indirect technique, remove the rough pattern and touch the shiny concave contact point region with a small bit of melted yellow or orange crayon wax. Apply with a hot carver. The brilliant color contrasts well with the blue, green, or purple inlay wax and when the pattern is placed in the tooth and carved and contoured, one is warned *never* to touch the brightly colored area of contact.

Fig. 6

technique involved; and jot down the advantages of the technique. This shouldn't take ten minutes of your time.

Turn to page 632 for a convenient form to use.

Send your ideas to: Clinical and Laboratory Suggestions Editor, THE DENTAL DIGEST, 708 Church Street, Evanston, Illinois.

Lower Anterior Bridge Restoration

EARL J. POE, D.D.S., St. Louis

A strong esthetically pleasing pontic for the lower anterior fixed bridge is a denture porcelain tooth with the pins cut off, grooves formed in the mesial and distal positions, and a casting similar to a three-quarter crown used on the lingual of the tooth. The gold reaches just to the shoulder on the lingual, gold on the incisal thus being eliminated.

Doctor Poe's suggestion is illustrated with a case in which lower central incisors are replaced by a fixed bridge with this type of pontic.

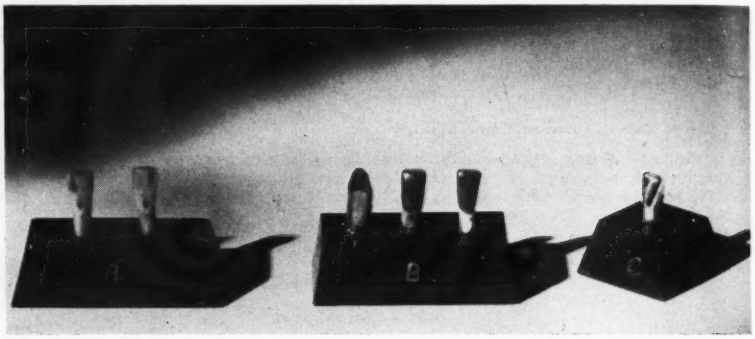


Fig. 1—(A) Preparations of laterals. (B) Impressions by indirect-direct method. (C) Casting on lateral.

ONE OF THE difficult problems in restorative dentistry is the successful replacement of lower anterior teeth by a fixed or permanent bridge. The difficulty lies in combining maximum strength and pleasant esthetics.

1. The old-type bridge pontic with a porcelain facing protected by a gold incisal edge is extremely unsightly.

2. The newer types of facings with the translucent incisal edges lack strength under many circumstances.

Furthermore, none of the commercially prepared facings or pontics has the wide selection of molds that can be found in denture teeth.

Preparation of Pontic From Denture Tooth

For the replacement of lower anterior teeth by a fixed bridge, a simple but strong preparation can be made

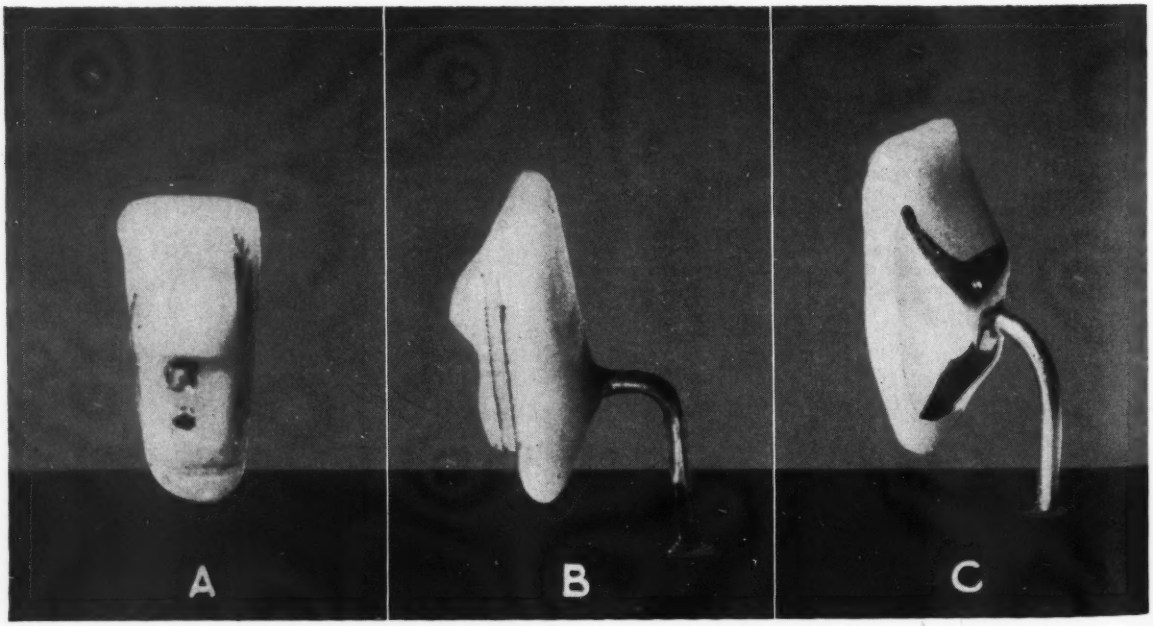


Fig. 2—(A) Lingual view of denture tooth. (B) Mesial or distal view of prepared denture tooth. Pins removed. (C) Casting in position on denture tooth to be used as a pontic.

quickly on a commercial denture tooth to serve as a more esthetically pleasing and stronger pontic.

1. The entire labial, gingival, and incisal contours of the denture tooth are undisturbed, the preparation being made entirely on the lingual surface.

2. This lingual preparation is an up-side-down three-quarter that, when cast, forms a cradle or seat in which the pontic is cemented into the assembled bridge.

3. The pins of the denture tooth are completely ground off (Fig. 2A).

4. A heavy groove is cut on the mesial and distal sides of the tooth far enough toward the lingual to avoid the display of any gold (Fig. 2B). (These grooves should be placed in such a position that they are of maximum length, however.)

5. The two grooves are joined by reducing the lingual portion of the gingival surface (Fig. 2C).

Replacement of Lower Central Incisors

In the case illustrated here, the lower central incisors are to be replaced.

1. Preparation of laterals. Grooves are formed on the mesial of each tooth only (Fig. 1A). Wells are placed with a 700 bur at the distal-incisal corner and at the cingulum. These pins are used in preference to a second groove on the distal in order to eliminate the display of gold which would result from a slice-type preparation on fan-shaped or flaring lateral incisors.

2. The indirect-direct method of procuring wax patterns is followed (Fig. 1B). After taking the usual copper band impression and either copper plating or pouring dies, the pattern is waxed, carried to the mouth, and refined.

3. After the abutments are cast and placed in position, the usual bite and impressions are taken.

4. Each pontic is waxed and cast separately (Fig. 1C) and the bridge assembled and soldered.

Esthetics, Strength, and Durability

The finished bridge is esthetically

Fig. 3—Centrals to be removed and restored with a fixed bridge.

Fig. 4—Roentgenogram of case shown in Figure 3.

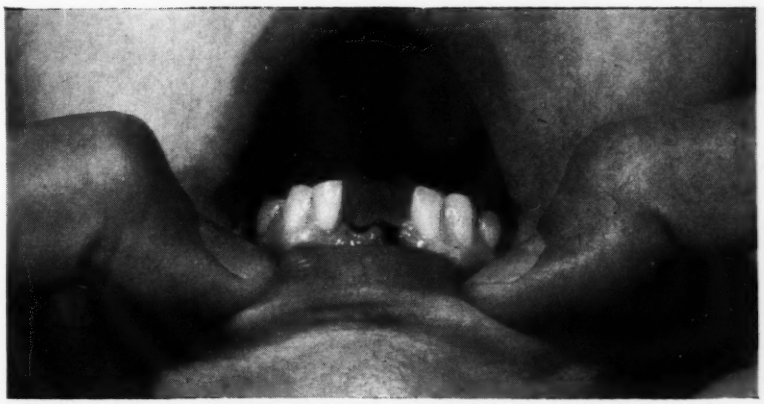


Fig. 5—Post-extraction view.

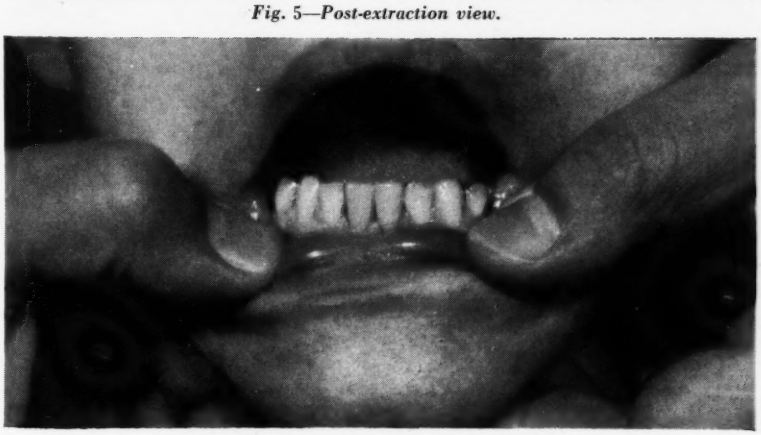


Fig. 6—Fixed bridge in position (Labial View).

good and provides a restoration of great strength with porcelain in contact with the gingival areas. Figures 6 and 7 show the labial and lingual views of such a bridge after eight years of service. Of the great number of bridges like this in service, only one has fractured and that was due to an auto accident. It was repaired by duplicating the pontic in wax and processing it in acrylic.

818 *Olive Street*

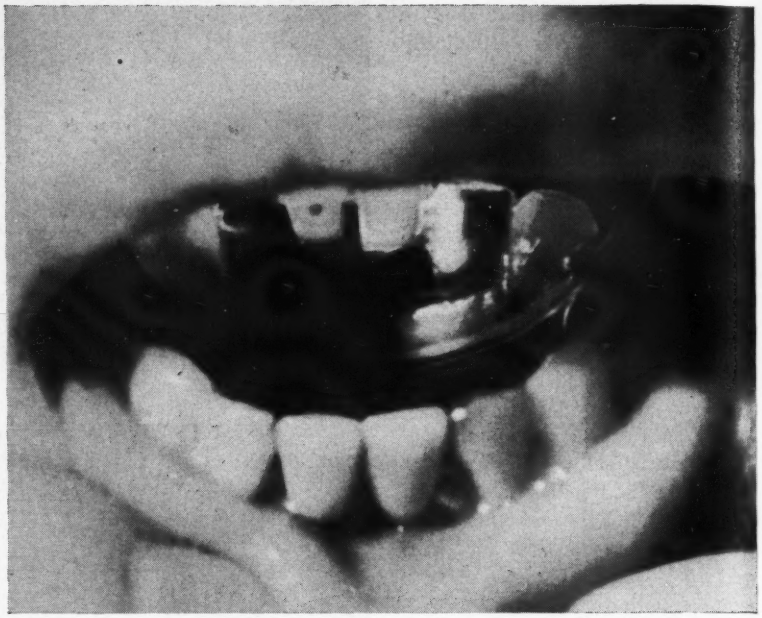


Fig. 7—Fixed bridge in position (Lingual View).

Prescription Writing by the Dentist

LEO STERN, JR., New York

THE DENTIST in general practice and the oral surgeon rarely accept their full responsibility for prescribing therapeutic agents to relieve pain and other conditions and to control infection. Such prescribing should, however, be considered an essential part of enlightened dental practice.

Drugs Concerned

The dentist, who is a Doctor of Dental Surgery or Doctor of Dental Medicine, is often in a position to benefit his patients by intelligently administering such drugs as: penicillin, the sulfonamides, morphine derivatives, salicylates, barbiturates, vitamins, and in emergencies, cardiac or central nervous stimulants. His reluctance to administer these medicines often arises from a feeling that his knowledge is inferior to that of his medical colleagues, and this self-judgment is quickly reflected in the opinion of the medical profession and the laity — that dentistry is really not one of the learned professions.

The ability to write a satisfactory prescription, based on the knowledge of therapeutics which modern dental education certainly provides, assures a higher level of patient care and adds to professional dignity. The drugs enumerated here are not an imposing list. Every dentist should know well the indications for their use, their side reactions and antidotal therapy.

Rules for Prescription Writing

Few endeavors of the dentist will pay larger dividends in general appreciation of dental service than writing individualized prescriptions clearly and accurately. The following rules of prescription writing were stressed in an editorial in the *Journal of the American Medical Association*, January 26, 1946:

1. The prescriber should use descriptive names for ingredients, not merely trade names.

2. A firm name should be placed next to the ingredient if the prescriber wishes to show his confidence in a particular manufacturer; otherwise, any brand may be used by the dispenser.

3. The use of abbreviations should be avoided, and the use of English preferred to Latin in the same interest of legibility and clarity.

4. The metric system should be used whenever possible as it is simpler and less conducive to error than the apothecaries' system.

5. Most important of all, the prescription should be based on a rational idea of therapy; complex mixtures should be avoided if simple ones suffice; unrelated substances such as purgatives and hypnotics are not properly included in a single prescription.

6. The dosage should be scrupulously stated and it should be specified whether the prescription is to be refilled and how often.

Conclusions

The dentist studies the same materia medica as the physician. Dental practice, however, tends to limit his working knowledge of drugs to a small number. Thus he is in a favorable position to know as much as anyone else about the drugs he may have to prescribe. Possessed of this knowledge, he can feel confident in prescribing the best therapy for his patient.

—From *The New York Journal of Medicine* 16:301-302 (October) 1946.

Contra-Angles

Old Doc Brady Gets Religion . . .

My old sparring mate of the newsprints, Doc Brady, the medical columnist, has at last found a good word to say for us dentists. I have panned the old boy so long and so hard, that I want to soften up a bit and give Brady a bouquet for a recent column of his. It's about a woman who pays big money for her hats and makes niggardly outlays for dental care. But let Brady tell his own good story: "The lady appeared at her club, wearing a new hat. I am glad I didn't see it. If I had it might not be so easy to deal calmly with the matter. The other members, in the usual state about it, lost no time in determining the origin of the hat—some kind of exclusive or snooty concern or individual whose hats sell 'from $80.'

"Of course, the members immediately wondered—they knew this lady's husband's job pays a salary of not more than $4,800 a year.

"Well, leave that to the cats.

"In the course of the afternoon this lady with the $80 hat was reminded that she must find a new dentist. It was disgraceful and something should be done about it, but doctors and dentists were gouging outrageously.

"Why, she had just received a bill from her dentist for just two small fillings, some porcelain work and cleaning her teeth—the whole thing took only two or three hours altogether and do you know that man demands $37. All she had to say was that he would certainly wait. . .

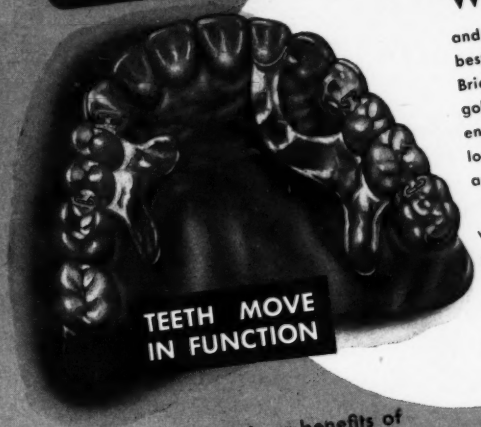
"There you have it folks.

"Draw your own moral.

"But first let me repeat something I have said here many times:

" 'For every tooth lost and not immediately replaced by a functionally satisfactory denture, one must deduct two years from one's life expectancy.'

SPECIFY *Chayes* MOVABLE-REMOVABLE BRIDGEWORK



WHERE a bridge or partial denture is indicated, anatomical, hygienic and esthetic requirements will be met best with Chayes Movable-Removable Bridgework. It eliminates the display of gold inevitable with clasps; prevents enamel abrasion; and avoids the critical loads on abutments present in fixed — and most clasp — bridges.

Chayes Movable-Removable Bridgework imposes no occlusal loads on the abutment teeth, as the bridge is tissue bearing. Movable vertically under pressure, it stimulates supporting tissue, greatly reducing resorption. Abutment teeth merely hold the bridge in place and are free to "move in function."

And to get these benefits of Chayes Movable-Removable Bridgework
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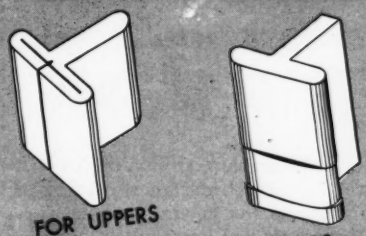

READILY OBTAINABLE

Chayes Bridgework is obtainable from any good laboratory. You need only prepare the abutment teeth for the three-quarter crowns or inlays which carry the attachments and provide accurate impressions and bites.

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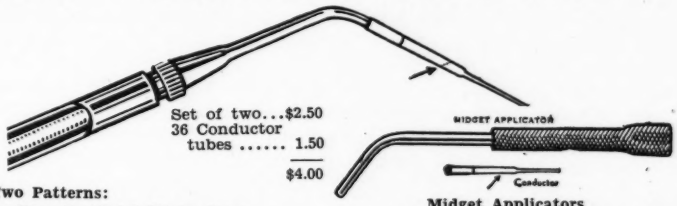

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In your ORAL HYGIENE this month

Understanding Human Nature In the Dental Office

"Good salesmanship, ability, desire to serve, and unselfish honesty are powerful agents for good; good not only to ourselves, but also to those we serve. Their use may easily be the determining factor for success or failure," says Doctor I. Kaufmann in the November issue of Oral Hygiene. You will want to read the entire article for it gives detailed information and advice every practicing dentist can use.

★ ★ ★

" 'Black-Market' Dentistry?" . . . An inquiring reporter, Beth D. Ryan, has gathered a great deal of interesting data on the prevalence of "black-market" dentistry in Massachusetts—facts that are important to the welfare of the dental profession throughout the country. "A dental laboratory on Boylston Street in Boston solicits customers right out on the street in front of their building," said one of the dentists interviewed. The article quotes the remarks of a number of dentists who are very much alarmed at the amount of dental service that is being sold directly to the public by unethical dental laboratories. Does this condition exist in your town?

★ ★ ★

"Do State Dental Board Requirements Need Revising?" . . . "Yes," says Doctor G. J. Bigsby who has made a comprehensive study of the subject and now reports in detail on the outmoded requirements of many of the boards.

★ ★ ★

"Is it Significant to Analyze Your Income?" . . . A certified public accountant explains the benefits to be derived from an analysis of your income. The methods suggested by Irving Elbaum may save you money in several ways. It will be well worth your while to read this article carefully.

★ ★ ★

"The Fee Question" . . . Always an interesting question—and sometimes a touchy one, it is discussed frankly and candidly by Doctor I. Franklin Miller.

★ ★ ★

"Legal Risks in Everyday Practice" . . . A lawyer, Renzo Dee Bowers, gives actual case histories to illustrate some of the ways in which dentists may safeguard themselves against lawsuits.

★ ★ ★

"Have You a Hobby?—Better Get One" . . . Before you say you haven't time for hobbies, read Doctor Newman D. Winkler's story of how he found time for his hobby and the satisfaction he derived from it.

★ ★ ★

Short articles, features, and your favorite departments round out the issue.

"And in answering queries from lawyers who have personal injury cases I have said many times that in my opinion $1,000 is a fair compensation to allow for the loss of a tooth."

I am not sure how widely courts have accepted Brady's evaluation of a tooth at a thousand dollars. I suspect that many juries award far less in personal injury cases where a tooth is lost. How much, for that matter, is a life worth? Whose life? If one tooth is worth a thousand dollars, a life should be worth at least a million. Sentimentality entirely aside, how many people are worth a million dollars to the world? How many have the facilities of brain and spirit to contribute that much to human advancement? Not many, I am sure. The people who neglect their teeth, who are entirely indifferent to dental care, are not entitled to anything like $1000 for the loss of one tooth.

In another case where a person is careful of his appearance and is attentive to his dental mechanism, the loss of a tooth is a tragic thing. Awards for personal injury should be made according to the person injured. An ignoramus who will not spend $2 to save a tooth is not entitled to $1000 for the loss of one. The person who has worked conscientiously over his dental mechanism and who looks upon teeth as an asset to appearance and health, is easily entitled to more than a thousand dollars.

All dentists should be glad to see Doc Brady getting "religion" and putting in a good plug for teeth values and for dental care.

"Sex in Technicolor" . . .

There is a title for you! By comparison how dull and drab are our articles on dentures and oral surgery and disease states. That spicy number is the title for an article in one of the slick women's magazines. You bet I paid a quarter for the magazine when I thought I would get a look at sex in technicolor! But disappointment was my lot. The title was a delusion and a snare—a come-on to read an article *about the movies.*

Although I didn't get my money's worth in the article, I wasn't going to

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of POLIDENT—the denture cleanser of proven merit — help to insure long life, proper function and spotless appearance of the prostheses you created. • Because it gently *dissolves* mucin, tarnish, and food débris, POLIDENT avoids abrasive injury to dentures, yet penetrates into the deepest and narrowest crevices, often quite impossible to reach by frictional cleansing. • It will take little of your time to explain to your patients how easy and safe it is to use POLIDENT! • Send for samples to Hudson Products, Incorporated, 8 High Street, Jersey City 6, N. J.

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15 minutes in solution (or overnight) 1 glass water to 1 capful of POLIDENT

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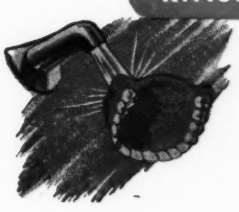

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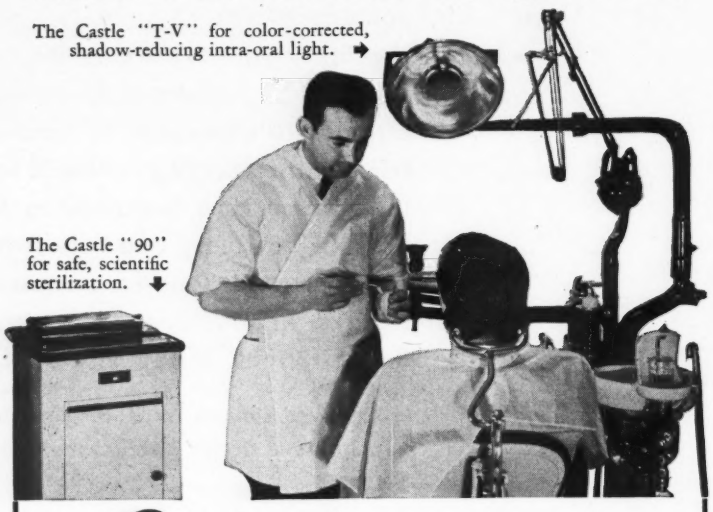

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lose my investment without some returns. The article on "How to Buy a Girdle" I passed over lightly in favor of a picture of a dame in a low-necked dress who is handing out this kind of advice to her women readers: "Start your beauty program now for a bare-but-beautiful look because . . . someone will be looking over your shoulders when you go dancing in the new low-line gowns." Now that's good clean advice for any woman who is troubled by the Peeping Tom of the dance floor. Note well that this adviser does not suggest that women wear high collars or capes to shield them from the evil eyes peering over their shoulders. There is no moralizing or prudery here; the advice is direct and honest: Those of you who are going to be stared at—and you are—better get yourself under a beauty program that will help you develop something that will be worth staring at. That's what I call truth in writing.

Another gem of good advice is to the woman who is having trouble adjusting her perfume to her personality. And what poor dear at some time doesn't have this problem? For the woman caught in that most horrible of all neuroses, "perfume conflict," the learned psychiatrist of the perfume division of this woman's magazine, has these cheering words: "Every woman should have a *wardrobe* of perfume and a personality full of moods and changes. We believe that various scents can help you feel demure, or capricious, or sophisticated, or sultry—pretty much according to whim. And of course, psychologically, if *you* feel that way, your public is likely to find it contagious, too."

We poor dentists all these years have been inhaling the various scents from the wardrobe of perfumes and picking up the personality contagions that were being subtly wafted at us by these vixens and sirens in our dental chairs with their natures full of moods and changes. In my crude way I have been calling some of these women with their odd moods and changes just downright bitchy. I am now chagrined to learn that they were merely expressing the perfume per-

*Unretouched photo shows patient with Steele's P.B.E. facings replacing lost upper centrals and laterals.

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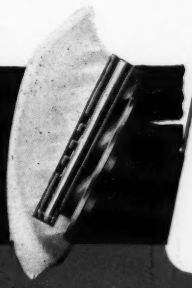

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A TYPICAL LETTER . . .

[redacted] D D S
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June 15-1946

The Dental Digest
Gentlemen:-

Inclosed find check for a copy of Clinics on Paper which you will please send to the inclosed address with my compliments.

It's too bad every dentist does not know of this clever helpful publication. Many thanks

Resp. yours,
[redacted]

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THE DENTAL DIGEST 1005 Liberty Avenue Pittsburgh 22, Pa.

sonality of their selection. Some of my women patients seem to get mixed up on their scent signals and pull the wrong cork the day that they come for a dental appointment. I always seem to get some horsy dame who used the demure personality bottle or some horrible hag who poured the sultry personality over her that morning.

Knowledge is a great thing. From now on, I'm not going through every day the innocent victim of these perfume personalities who have been infecting me with their contagions of the personality demure, capricious, sophisticated, or sultry. I'm going to get myself a bottle of one of those sure-fire odor killers, with or without the wick, and live a good clean life free from those sirens of the perfume bottle who have been dragging my poor weak personality back and forth from one emotion to another. Although I didn't get "sex in technicolor" for my 25 cents, I learned the horrible truth of what women have been doing to me all these years with their secret wardrobes of various scents. Today I can take a deep breath with the confidence that my emotions are at last free and emancipated and are no longer being undermined by the perfume personalities. Knowledge is, indeed, power.

Irony of the Day . . .

On the centennial day (October 16, 1946) that commemorated the introduction of ether anesthesia to the world, eleven criminals against society died in Nuernberg in Germany. A hundred years ago when William T. G. Morton, the Boston dentist, gave ether to mankind, he made the greatest contribution to the conquest of pain. Although, in his later life, Morton was ill advised and made an attempt to capitalize excessively on his discovery, the fact cannot be withdrawn that his contribution to the world was without equal.

Unlike Morton, the war criminals who died by the hangman's rope in Nuernberg lived their years by destruction. Morton conserved life and found a way to protect Man from pain. The Nazi criminals tortured their enemies and destroyed their own

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From:_____

_____

Subject:_____

Explanation of Procedure:

Sketch:

$10 will be paid to author on publication of accepted suggestions.

people. They lived by the sword and died by the garrote.

On the Ether Day centennial the headlines were large and black with the news of the executions. No words, or, at best, a few carried the news from Boston of the re-enactment of the nineteenth century drama by Morton in Massachusetts General Hospital. This emphasis by newspaper people on crime, depravity, and destruction is not unusual. People living the good and constructive life are considered to be dull personalities by newspaper standards. The rapists, the gangsters, the bank robbers, and their arch enemies, the Federal Bureau of Investigation, take the headlines. The philosophers, research scientists, and the hard-working good people of the world seldom make the headlines and only occasionally receive favorable mention in newspapers.

There is another indictment to be directed against the press; namely, the fomenting of strife and discord; stories of threats of wars, of riots and strikes, of incompetency and dishonesty among officials and of all manner of personal violence and menace fill the paper. Search and you will not find anything about the unselfish people caring for the lame and the halt or of the loyalties of people or of the sacrifices that they often make.

Reading the papers with the details of evil people doing evil things could give one a warped slant on life and be the cause of some deep and malevolent mental quirk. We need more antidotes for that—stories about the good things. This is no Pollyanna business nor is it the philosophy of looking away and denying the meanness of people and of nations. A little balance is all that we ask for—a story of Morton and his modern counterparts, for example, balanced against the grisly reports from the execution chamber.—E. J. R.

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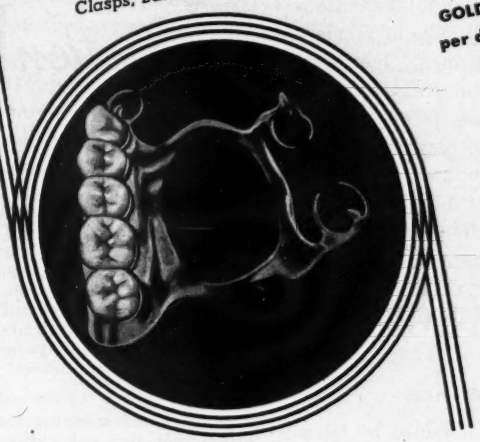
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Then the vitamin content of the cow's milk becomes even lower in comparison with the vitamin content of an equal volume of breast milk.

Conclusions

1. The "balanced" formula prescribed by the older nutritional science is far from balanced in the light of the new knowledge.

2. It seems to be the tacit conclusion of all the investigators who participated in the study that healthy mothers' milk is the best possible food for the newborn infant.

3. It is recognized that some 14 per cent of women, even with the best of physical and psychological preparation, are unable to produce an adequate milk supply; the new knowledge should be of extreme importance and usefulness to the physician in devising artificial formulas for the infants of these mothers.

—From *What's New* 102:9 and 28 (April) 1946.

Intravenous Procaine Analgesia

(*Continued from page* 611)

Pain is relieved rather soon during the injection and the relief continues for about four or five hours.

2. McLachlin points out that, if a rare idiosyncrasy to procaine should give rise to toxic symptoms, these may be of two types: a nervous convulsive type which can be relieved by intravenous injection of a barbiturate such as sodium amytal or sodium luminal, and a respiratory asthmatic type which can be controlled by as little as 2 minims of 1/1000 epinephrine solution given subcutaneously.

3. Sensitiveness to procaine can be tested by beginning the intravenous procaine infusion slowly. Since only a small amount is thus introduced and since procaine is destroyed in the liver within ten minutes, the danger is virtually negligible even without antidotes. Certainly it is less than with the ordinary infiltrations in which the operator injects an entire

Dental Patients on Parade

It is a fact that there is more dentistry that should be done than there are operating hours available to take care of it. But dentistry is again being embraced within the sphere of business competition—competition for the public dollar. Automobiles, radios, home appliances, clothing, and many other products are again reaching the market in increasingly larger volume.

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dose and must face the consequences; nevertheless, we make a skin test for sensitiveness as a routine preliminary in every case.

Modified—The original method was adopted for clinical trials in a wide variety of painful conditions and the favorable results of previous observations confirmed; but soon considerable modification in both dosage and time was introduced by: (1) increasing the quantities of infused fluid and procaine, (2) lengthening the period of infusion, (3) using glucose solution when saline might conduce to harmful edema, and (4) extending the range of application of tests to all kinds of painful conditions.

Advantages of Method

Local analgesia obtained by intravenous procaine administration is explained provisionally on the previously stated hypothesis of increased vascular permeability. This method has definite though limited value; and when hypersensitiveness to procaine has been excluded by preliminary tests, and when the administration is kept within the limits set by dizziness or other subjective symptoms, there appears to be no danger whatever.

Deaths are known from local infiltration anesthesia and from spinal anesthesia, because the anesthetic agent when once injected is out of control of the operator. It is surprising that physicians who routinely use these methods should fear the intravenous administration of procaine since (1) the infusion can be begun slowly and increased cautiously, (2) it can be halted at any sign of danger, and (3) the textbooks give assurance that any circulating procaine is destroyed within a very few minutes. *This intravenous method, therefore, has an advantage of safety over those methods in which the rate of absorption is uncontrollable.*

This new method is in use because of its evident advantages of (1) rapid and flexible control, (2) absence of accompanying injury or after-effects, (3) and high degree of safety as far as can be judged to date. The need of skill and care must be emphasized, and deaths can undoubtedly be ex-

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pected if this method is employed recklessly. As soon as possible, collaborative studies will be published which will attempt to establish a more adequate basis for acceptance or rejection of the method.

The pain of war wounds could have been controlled easily and effectively, especially as wounded men received intravenous infusions almost routinely, and it would have been necessary only to add a little procaine to the solutions in order to give relief without the deleterious effects of morphine and other strong sedatives.

Conclusions

Intravenous procaine infusions, within the limits set by dizziness and other subjective symptoms, can relieve many forms of pain in an effective, prolonged and safe manner.

The infusions in higher dosage produce a clinically new form of general anesthesia by action upon the central nervous system. It is hoped that this method will prove valuable for various purposes, but there has not yet been sufficient experience to define accurately the uses, limitations or possible dangers.

—From *Current Researches in Anesthesia & Analgesia* 25:1-9 (January-February) 1946.

Brucellosis in Human Beings

THURMAN B. RICE, M.D.,
Indianapolis

CHRONIC BRUCELLOSIS (undulant or Malta fever) is probably much more common than has been supposed.

Symptoms

It rarely happens that a sharp diagnosis can be made immediately because the symptoms are indefinite. The patient does not feel well, is in poor flesh, tires easily, and lacks pep." He often complains of arthritis, stiff and aching joints.

As a matter of fact, the well-known symptoms of chronic focal infection ascribed to the streptococcus are very

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS, OF AUGUST 24, 1912.

Of The Dental Digest, published monthly at Pittsburgh, Pa., for October 1, 1946.

State of Pennsylvania,
County of Allegheny,
ss.

Before me, a Notary Public in and for the State and county aforesaid, personally appeared M. B. Massol, who, having been duly sworn according to law, deposes and says that he is the Publisher of The Dental Digest, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in Section 411, Postal Laws and Regulations, printed on the reverse side of this form, to wit:

1. That the names and addresses of the publisher and editor, are: Editor, E. J. Ryan, B.S., D.D.S., 708 Church Street, Evanston, Ill.; Publisher, M. B. Massol, 1005 Liberty Ave., Pittsburgh, Pa.

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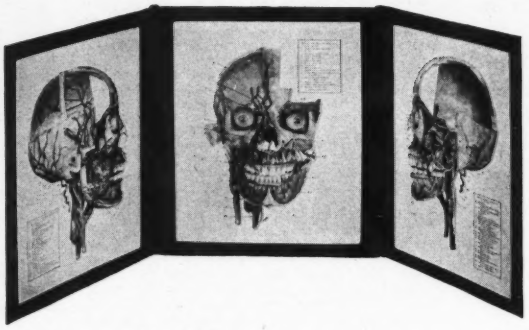

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similar to those of chronic brucellosis. It may well be, then, that diseased tonsils and teeth are not solely to blame. Many of the symptoms, also, are like those of moderately advanced tuberculosis.

When a patient complains of chronic ill health, it may be advisable to consider the possibility of brucellosis. Careful medical treatment of such a case will commonly result in marked improvement of the symptoms.

Treatment

Rest and improved nutrition are of utmost importance. Vaccines and other biological products are to be used at the discretion of the medical attendant. Streptomycin is of *no* value in the treatment of *chronic* brucellosis.

—From *Monthly Bulletin, Indiana State Board of Health* 6:125 (June) 1946.

DENTAL MEETING Dates

Pan American Odontological Association, tenth annual dinner meeting, Hotel Pennsylvania, New York City, December 11.

•

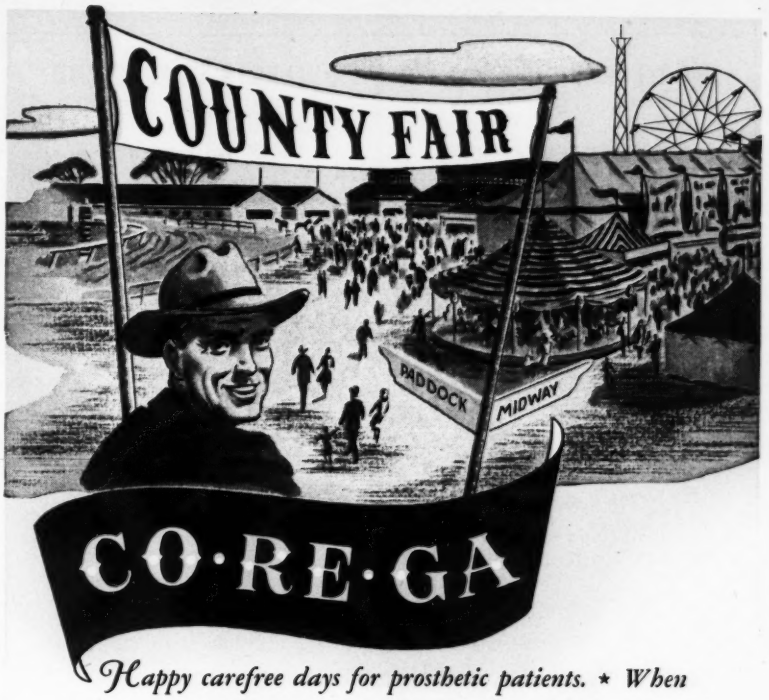
New Jersey State Board of Dental Examiners, regular meeting, December 9-14. For information write to Doctor W. A. Wilson, 150 East State Street, Trenton.

•

Pennsylvania State Dental Society, annual meeting, Hotel Bellevue-Stratford, Philadelphia, May 6-8, 1947.

•

Tennessee State Dental Association, eightieth annual meeting, Hotel Andrew Jackson, Nashville, May 12-15, 1947.



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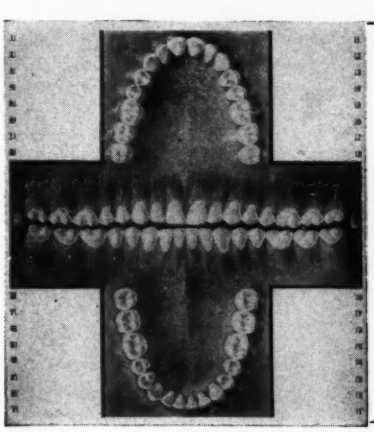

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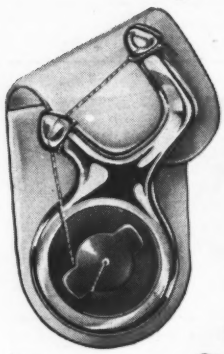

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